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ABSTRACT

This course of study in carpentry is intended as a teaching and learning guide and presents the basic skills needed for initial employment in carpentry. Introductory material includes an outline of general course objectives and corresponding activities to achieve the objectives, an instructional plan which suggests course length, use of the guide, teaching methods, vehicles of instruction, a bibliography of reference materials, and a listing of the titles of skill competency development jobs which correspond with specific job sheets in the body of the guide. The major portion of the guide consists of (1) job sheets, which indicate to the student what to do in performing the various jobs assigned by the instructor (sheets also include unit title, specific job title, material and equipment needed, and method of evaluation); and (2) operation sheets, which supplement the job sheets and indicate to the student how to perform the many skill competency operations necessary to complete the assigned jobs. Two sample sheets (information and assignment sheets) supplement the job sheets and are included to help the student complete the assigned jobs with the highest possible degree of understanding. (SH)

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ED150344

TRADE AND INDUSTRIAL EDUCATION

COURSE OF STUDY

FOR

CARPENTRY

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IN COOPERATION WITH

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Harrisburg, Pennsylvania

1977

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CARPENTRY

This Course of Study was designed by three working vocational instructors. We do not intend to imply that you, as an instructor, should not change all or any part of this material; feel free to do so.

The organization of this material is based on the construction of frame building. In the beginning we gradually introduce basic hand tools and their uses. From this point we can then lay out a building; build foundation and concrete forms; frame floors, walls and roofs, finish the exterior and interior of the building.

The above divisions may be taught in varying order, with the exception of Hand Tools. We feel that hand tool competency must be mastered before the other divisions can be attempted.

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- Information Sheets (Sample) 795
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SHEET METAL

This Course of Study was developed by three working vocational instructors. We do not intend to imply that you, as an instructor, should not change all or any part of this material. Feel free to use it as it exists, use parts of it or change it in any way you see fit.

This course was not designed to be all encompassing in scope or nature, but rather to provide a student in sheet metal with the basic skills necessary to be a success. The jobs chosen were designed to be introduced at a specific point in the course. You as an instructor, may wish to substitute representative jobs for those provided. Please be careful that any substitute job introduces only the new skill competency designed to fit at that time into the course.

Because of varying equipment and individual differences we felt each instructor would be better able to supply the necessary information as needed, for these reasons we have supplied you with suggested information lesson titles only.

Due to the complexity of information and the need to fabricate what is layed out, we have not taught layout by parallel line, radial line and triangulation in the drafting section but rather chose to teach each method on the bench as it occurs. Some instructors may prefer to have the first exposure to these layout methods taught on the drafting board, this can be easily accomplished by adding basic layout jobs and the necessary information lessons to the end of the drafting section.

PREFACE

In recent years, we have planned and constructed the finest of vocational education facilities and have placed fine equipment in these facilities. Equal attention must be directed to provide the teacher with the basic tools for instruction to assist in providing quality instruction.

This basic course of study is intended to be used as a teaching and learning guide. The information provides the basic skills of the occupation, so that the students who successfully complete the course will have sufficient competencies for initial employment and ample orientation for growth and advancement. The teacher who uses this course may find it necessary to modify and supplement the material to meet the needs of specific students and the local industrial community.

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Senior Program Specialist
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Frederick G Welch
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COURSE PHILOSOPHY

This course in Carpentry will serve the needs of students who plan on entering the Construction Industry as a carpenter apprentice or learner and those who can become better citizens in the community with the benefit of a knowledge of carpentry.

This course will offer an opportunity for students to develop skills, knowledge and attitudes most desirable for entering the Construction Industry. Special emphasis will be placed on the development of good attitudes in employer-employee as well as fellow workman relationships, safety and a feeling for the dignity of work.

Through course arrangement and scheduling, students will be afforded an opportunity to progress at the rate at which they are most capable. Leadership assignments will be made for those who display the ability; crew responsibilities for those who need more time.

GENERAL COURSE OBJECTIVES

Objectives	Activities to Achieve Objectives
1. To develop specific skills and related knowledge associated with the carpentry trade.	1. Series of individual jobs, live work. 2. Practice exercises. 3. Group assignments, live work. 4. Provide job sheets, operation sheets, information sheets and assignment sheets for individual students. 5. A portion of each session will be devoted to classroom instruction.
2. To develop an understanding of the relationship of labor and management.	1. Present speakers from industry--both labor and management. 2. Assign reading in trade magazines. 3. Discuss topics dealing with: a. Responsibilities of management. b. Responsibilities of employees. c. Benefits available to employees.
3. To develop good work habits and attitudes.	1. Establish high standards of achievement. 2. Provide an environment conducive to learning. 3. Measure students' progress and abilities objectively.
4. To develop a respect for, and practice of, good safety habits.	1. Safety literature and posters will be used extensively. 2. Make safety a major guideline of every operation. 3. Provide safety devices and guards wherever a hazard exists. 4. Student safety committee will be actively involved in program.
5. To develop the ability to work cooperatively with fellow workers.	1. A percentage of the time will be spent in group activities. 2. Encourage students to help each other. 3. Students will be assigned as crew members.
6. Develop leadership qualities.	1. As an upper classman, the student will be expected to assume a role of responsibility. 2. Students will be involved in planning and appraising their own work. 3. Students will progress to assuming leadership roles.

PLAN OF INSTRUCTIONAL PRACTICE

The effectiveness of instruction depends on the careful organization and control of the routine details concerning the management of the pupil, equipment, teaching methods and the physical laboratory arrangement. The teacher must determine the best management practices and formulate a very definite statement of the basic standards to be followed in teaching the course to bring about the attainment of the learning goals.

Length of Course

The course of study is designed as a three-year curriculum involving approximately 1500 hours of class and laboratory instruction, primarily for beginning students who are interested in securing employment in the occupation. Where job entry is the goal, the entire course of study would be appropriate. In adults programs, it may be found that a single thrust is the student's goal, therefore, the course content may be restricted to a single major division.

Use of This Course of Study

The material has been arranged in major divisions of the trade. In most cases, the material contained in the first division must be learned before progressing to the next division. The nature of some trade areas permit entry into random divisions after the introductory basic material is covered. Some divisions of the occupation can be taught separately.

The content of this course material consists of job sheets (yellow) and skill competency sheets (white). The skill competency sheets are simply written and highly illustrated. These sheets outline the manipulative handling of tools and materials that make up the doing part of the occupation. The sequence of the skill competency sheets (SC) is based on the organization of the job sheets. Notice that job number one incorporates the basic skill competencies and job number two includes additional skill competencies. This cumulative reuse of the skill competencies continues throughout the entire job sheet collection. After a number of jobs have insured that the student has been sufficiently exposed to a skill competency, no further reference to that skill competency is made.

The job sheets are arranged in an order that gradually exposes the skill competencies. The purpose of the job sheet is to insure the introduction of each operation or skill competency in a controlled manner. Look at this group of jobs as a framework that can be added to, by you, to meet local needs. You may decide to design new or different jobs that will be inserted between or replace any of the suggested jobs. In time you will be able to custom design a course of study for your own needs. There will be little or no need to vary the skill competency sheets.

Teaching Methods

The following procedures are offered as the most productive in achieving the desired results in this course.

1. Demonstrations--Operations and procedures will be demonstrated while the students observe. The purpose is to show how things are done correctly and safely.

2. Class Discussion--A method of teaching in which the students and the teacher take part, directed and controlled by the teacher to a predetermined objective. Technical and related information common to a class or group of students will be presented in this manner. Evaluation of the material presented in this manner should be done by objective testing.

3. Laboratory Talks--Short, informal talks by the instructor during laboratory activities to convey information pertinent to the activity in progress. Not scheduled and not timed, this activity should occur at any appropriate time and for periods of varying duration.

4. Observation and Input--This teacher activity should take place at all times when students are performing psychomotor skills. The purpose is to reinforce a previously given demonstration, class discussion, or laboratory talk, or to update the students' skills by further demonstration and/or further disclosures of technical and related information.

Vehicles of Instruction

The application phase of this course will consist of work assignments kept as close to industrial conditions as a shop situation permits. Job, operation and information sheets will be provided, so that students of different levels of skill and ability can understand them. The students will be encouraged to progress as rapidly as possible, and achieve the standard set for the course. Special attention will be given to the unique student, offering special assistance so that slow as well as fast students may progress at their own rate of speed.

Items to be Developed by Teacher

The following items are peculiar to the local school situation and need to be developed by each local instructor.

. Standards of attainment required
. Pupil work evaluation
. Shop controls and regulations
. Pupil personnel organization
. Method of tool check
. Records and forms

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Albany, New York: Delmar Publishing, Inc.

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Madison, Wisconsin; Washington, D.C., U.S. Government Printing Office.

COURSE OUTLINE

Instructional Title: Carpentry   Code: 17.1001

Occupation Description

Interprets blueprints, shop drawings, specifications and detail drawings to determine dimensions, relationships and materials to be used. Constructs, erects, installs and repairs structures and fixtures of wood, plywood, wall board and composition. Selects and estimates specific materials needed. Prepares layout using rule, framing square and dividers. Marks lines for cutting and assembly on material and cuts it to size. Assembles units using nails, dowels, glue, staples, and power driven fasteners. Erects framework and applies exterior and interior finishes to structures. Fits and installs prefabricated cabinetry, laminated plastics, floor and ceiling tile, weather strip and finish hardware. Constructs concrete forms, pouring chutes, scaffolding and shoring. May weld metal parts to steel structural members.

This course is based on the construction of a house. The following is an outline of Major Divisions, Jobs and Skill Lessons to be used as a guide in the sequence they would be encountered in an industrial situation.

MAJOR DIVISIONS OF THE OCCUPATION

I. Orientation

II. Hand and Machine Tool Processes

III. Building Layout

IV. Foundations and Concrete Forms

V. Floor Framing

VI. Wall Framing

VII. Roof Framing

VIII. Exterior Finish

IX. Interior Finish

Skill Competency Development Jobs

The following is a list of suggested Jobs, assigned by the teacher, to provide experiences for the student to assist him in developing competencies of the Carpentry trade. These are Job Titles only. The numbers correspond with the identifying numbers on the Job Sheets that follow.

Unit I.	Orientation
......	
Unit II.	Hand and Machine Tool Processes
J-2-1	Lay Out Stock to Length
J-2-2	Lay Out Stock to Width
J-2-3	Cut To Length With a Hand Saw
J-2-4	Cut To Width With a Hand Saw
J-2-5	Plane the Edge Grain of Wood
J-2-6	Plane the End of Stock
J-2-7	Chamfer Corners of Stock
J-2-8	Bevel the Edge of Stock
J-2-9	Sand Wood By Hand
J-2-10	Drill Holes With a Hand Drill
J-2-11	Drill Holes With a Brace and Bit
J-2-12	Drill Holes With a Push Drill
J-2-13	Drill Holes With an Electric Drill
J-2-14	Assemble Wood Members With Screws
J-2-15	Assemble Wood Members With Wood Screws and Spiral Screwdriver
J-2-16	Clamp Pieces of Stock Face to Face With C-Clamps and Hand Screws
J-2-17	Assemble Wood Using Glue
J-2-18	Make a Bench Hook
J-2-19	Lay Out 45° Angles
J-2-20	Make a Miter Box
J-2-21	Lay Out Small Curves and Arcs
J-2-22	Cut Curves and Arcs With a Compass Saw

J-2-23	Cut Curves With a Coping Saw
J-2-24	Cut With a Sabre Saw
J-2-25	Shape and Smooth Curved Surfaces With a Wood Rasp or File
J-2-26	Rip Stock on Table Saw
J-2-27	Joint The Edge of Stock
J-2-28	Cut To Length With a Radial Arm Saw
J-2-29	Enlarge or Transfer an Irregular Design
J-2-30	Assemble Butt Joints by Nailing
J-2-31	Assemble Butt Joints By Nailing
J-2-32	Make a Tool Box
J-2-33	Whet Cutting Edge of Wood Chisel
J-2-34	Sharpen a Plane Iron and Wood Chisel
J-2-35	Make the Notch (or Gain Joint)
J-2-36	Lay Out Angles With a Framing Square
J-2-37	Lay Out Braces With a Framing Square
J-2-38	Lay Out Saw Horse or Trestle Legs
J-2-39	Lay Out Saw Horse or Trestle Legs
J-2-40	Cut Compound Angles
J-2-41	Build a Saw Horse
J-2-42	Cut Dadoes and Rabbets With a Radial Arm Saw
J-2-43	Shape Edges With a Router
J-2-44	Cut Grooves, Dadoes, and Rabbets With a Router
J-2-45	Make a Nail Tray

Unit III. Building Layout

J-3-1	Prepare Layout Stakes
J-3-2	Drive Layout Stakes - Attach Dryline
J-3-3	Square a Corner Using 3-4-5 Method
J-3-4	Establish a Rectangle with Layout Stakes
J-3-5	Locate and Stake Out Building on a Lot

J-3-6	Set Up and Level a Level Transit
J-3-7	Swing Horizontal Angles with Level-Transit
J-3-8	Establish Elevations on Stakes
J-3-9	Set Grade Stakes with Carpenter's Level
J-3-10	Set Stakes in Line
J-3-11	Drive Batter Board Stakes
J-3-12	Establish Elevations for Batter Boards
J-3-13	Apply Batter Boards
J-3-14	Locate Building Lines on Batter Boards
J-3-15	Establish Reference Marks on Batter Boards
J-3-16	Stake Out Building and Erect Batter Boards

Unit IV. Foundations and Concrete Forms

J-4-1	Establish Guidelines for Excavation
J-4-2	Make a Story Pole for Excavation Depth
J-4-3	Plumb Building Corners Into Excavation
J-4-4	Establish Footer Lines
J-4-5	Lay Out and Set Footer Forms
J-4-6	Place and Tie Reinforcement Steel In Footers
J-4-7	Build and Set a Pier Footer Form
J-4-8	Construct A Step Footer
J-4-9	Establish Wall Lines on Footers
J-4-10	Construct Wall Form Panel
J-4-11	Set Outside Wall Form
J-4-12	Construct and Set Box Form For Opening In Concrete Wall
J-4-13	Set and Tie Reinforcement In Forms
J-4-14	Construct and Set Inside Wall Forms
J-4-15	Apply Walers and Braces
J-4-16	Install Anchor Bolts in Concrete Forms
J-4-17	Build and Set Forms for Door Openings in Concrete Walls

J-4-18	Construct Concrete Wall Forms
J-4-19	Set Form For a Concrete Sidewalk
J-4-20	Construct Runways and Pouring Chutes
J-4-21	Build Wheeling Ramp
J-4-22	Set Door and Window Bucks In Masonry Wall
J-4-23	Lay Out and Cut Stair Form Stringer
J-4-24	Construct Forms for Concrete Steps (Closed)
J-4-25	Construct Forms for Concrete Steps (Open)
J-4-26	Set Forms for Concrete Floors and Slabs
J-4-27	Strip, Clean and Store Concrete Form Material
J-4-28	Rub Concrete After Form Removal

Unit V. Floor Framing

J-5-1	Lay Out for Anchor Bolts
J-5-2	Set and Brace a Column
J-5-3	Assemble Built-Up Wood Girder
J-5-4	Set and Secure A Girder
J-5-5	Frame and Install Sill Plate
J-5-6	Lay Out Regular Spacings for Floor Joist
J-5-7	Lay Out Spacing for Floor Joists
J-5-8	Lay Out on Sill Plate for Openings in Floor Framing
J-5-9	Frame Joist Header
J-5-10	Set Floor Joist on Regular Spacing
J-5-11	Straighten and Tie the Joists
J-5-12	Frame Stairwell and Other Openings in Floor
J-5-13	Lay Out A Pattern for Wood Cross Bridging
J-5-14	Cut Wood Cross Bridging with a Cutting Jig
J-5-15	Cut Wood Cross Bridging
J-5-16	Install Cross Bridging
J-5-17	Cut and Install Solid Bridging

J-5-18	Cut and Apply Diagonal Subfloor
J-5-19	Cut and Apply Plywood Subfloor
J-5-20	Lay Out a Stair Carriage
J-5-21	Frame and Install Basement Stairway
J-5-22	Install Safety Railing
J-5-23	Floor Framing

Unit VI. Wall Framing

J-6-1	Lay Out Sole and Top Plates for Regular Spacing
J-6-2	Lay Out For Openings and Partitions in Wall Frames
J-6-3	Make A Master Stud
J-6-4	Make and Use A Cut-Off Box or Jig
J-6-5	Construct an Outside Corner Post
J-6-6	Construct A Partition Post (T-Post or Take-Off Post)
J-6-7	Assemble Exterior Wall Sections
J-6-8	Erect Exterior Wall Sections
J-6-9	Lay Out, Assemble and Erect Exterior Wall Framing
J-6-10	Install Nailers and Backing at Intersections
J-6-11	Lay Out, Frame and Erect Partitions
J-6-12	Install Double Top Plates
J-6-13	Align and Brace Walls and Partitions
J-6-14	Install "Let-In" Corner Braces
J-6-15	Apply Plywood or Composition Wall Sheathing
J-6-16	Apply Wall Sheathing (Horizontal Board)
J-6-17	Apply Diagonal Board Sheathing
J-6-18	Construct a Single or Double Pole Scaffold
J-6-19	Erect Metal Scaffold
J-6-20	Lay Out and Frame Ceiling Joists
J-6-21	Install Special Nailers and Blocking

Unit VII. Roof Framing

J-7-1 Determine Length of Common Rafter (Step Off Method)
J-7-2 Lay Out Common Rafter Using the Unit Length Method
J-7-3 Lay Out Bird's Mouth Notch on a Common Rafter
J-7-4 Lay Out For Overhang on Common Rafter
J-7-5 Make A Rafter Pattern
J-7-6 Lay Out Ridge Board and Wall Plate For Rafters
J-7-7 Erect, Anchor and Brace a Gable Roof
J-7-8 Lay Out Rafter For Shed Roof
J-7-9 Lay Out, Cut and Install Gable Studding
J-7-10 Frame Opening for Louver in Gable End
J-7-11 Frame a Shed Roof
J-7-12 Frame a Gable Roof
J-7-13 Lay Out a Hip or Valley Rafter Using The Step Off Method
J-7-14 Lay Out a Hip or Valley Rafter Using the Unit Length Method
J-7-15 Drop a Hip Rafter
J-7-16 Lay Out Overhang for Hip or Valley Rafter
J-7-17 Shorten Hip Rafter At Ridge
J-7-18 Lay Out Side or Cheek Cuts on Hip, Valley or Jack Rafters
J-7-19 Lay Out Hip or Valley Jack Rafters
J-7-20 Lay Out a Cripple Jack Rafter
J-7-21 Lay Out Ridge Board For a Hip Roof
J-7-22 Frame a Hip Roof
J-7-23 Lay Out a Ridge Board for an Intersecting Roof
J-7-24 Lay Out Collar Beam
J-7-25 Frame an Intersecting Roof
J-7-26 Lay Out Gambrel Roof Rafters
J-7-27 Frame Opening In a Roof
J-7-28 Frame a Cantilever Gable End Rafter

J-7-29	Install Plywood Roof Sheathing
J-7-30	Frame a Gambrel Roof
J-7-31	Install Solid Board Sheathing
J-7-32	Install Spaced Board Sheathing
J-7-33	Build a Chimney Saddle
J-7-34	Apply Temporary Roofing
J-7-35	Construct a Dormer

Unit VIII. Exterior Finish

J-8-1	Install Blocking Between Rafters When Using An Open Cornice
J-8-2	Install Lookouts For Box Cornice
J-8-3	Install Plancier (Soffit)
J-8-4	Install Vent Strips or Ventilators in Soffit
J-8-5	Install Fascia and Frieze Boards
J-8-6	Cut and Install Moldings on Cornices (Crown, Cove, Bed)
J-8-7	Construct an Open Cornice
J-8-8	Construct a Closed Cornice (Box)
J-8-9	Construct a Receding Cornice (Sloped)
J-8-10	Construct a Flush Gable Cornice
J-8-11	Construct an Extended Gable Cornice
J-8-12	Install Nailers for Exterior Trim When Using Brick Veneer
J-8-13	Install Prefinished Cornice Materials
J-8-14	Install Drip Edge
J-8-15	Install Valley Flashing (Gravel Surfaced Roll Roofing)
J-8-16	Prepare and Install Chimney Flashing
J-8-17	Install a Roof Safe (Vent Stack) Flashing
J-8-18	Install Individual Flashing (Step-Flashing)
J-8-19	Apply Asphalt Strip Shingles
J-8-20	Apply Cap Shingles to Hips and Ridges
J-8-21	Apply Roll Roofing

J-8-22	Apply Wood Roofing Shingles
J-8-23	Apply Cedar Shakes
J-8-24	Apply Asphalt Roofing Shingles
J-8-25	Apply Building Paper to Sidewalls
J-8-26	Construct a Window Frame (Fixed Sash)
J-8-27	Construct and/or Install an Exterior Door Frame
J-8-28	Install Window Unit (Manufactured)
J-8-29	Install Door Unit (Pre-hung)
J-8-30	Construct and Install an Overhead Door Frame
J-8-31	Install Drip Caps and Flashings at Doors and Windows
J-8-32	Install Overhead Door
J-8-33	Install Belt Course
J-8-34	Apply Corner Boards
J-8-35	Install Gable Louver
J-8-36	Make a Siding Story Pole
J-8-37	Make a Siding Hook
J-8-38	Apply Horizontal Siding
J-8-39	Apply Vertical Siding (Aluminum)
J-8-40	Apply Panel Siding
J-8-41	Apply Wood Shingle Siding
J-8-42	Construct Porch Floor
J-8-43	Construct A Porch Beam (Chord)
J-8-44	Construct and/or Set Porch Posts or Columns
J-8-45	Install Porch Trim (Cornice and Columns)
J-8-46	Build and Install Porch Steps
J-8-47	Build and Install Porch Railing
J-8-48	Build Storm Sash or Window Screen
J-8-49	Cut Glass and Glaze A Window
J-8-50	Apply Screen Wire To A Wood Frame

Unit IX. Interior Finish

J-9-1	Install Flexible Insulation
J-9-2	Apply Gypsum Lath
J-9-3	Install Cornerite and Other Reinforcing for Plaster
J-9-4	Install Corner Bead for Plaster
J-9-5	Install Plaster Grounds
J-9-6	Apply Gypsum Sheetrock
J-9-7	Install Corner Bead for Plaster Board
J-9-8	Tape and Finish Gypsum Wallboard
J-9-9	Install Solid Wood Paneling
J-9-10	Apply Plywood or Composition Paneling
J-9-11	Install Underlayment
J-9-12	Mark for a Hinge Gain
J-9-13	Install Butt Hinges
J-9-14	Install A Lockset
J-9-15	Cut Gains for Hinges with a Router
J-9-16	Assemble and Set an Interior Door Jamb
J-9-17	Apply Casings to Door Frame
J-9-18	Fit A Door
J-9-19	Hang a Door
J-9-20	Install Door Stops
J-9-21	Fit and Hang a Door (Including Hardware)
J-9-22	Install Sliding Doors
J-9-23	Install Folding Doors
J-9-24	Install Window Stool and Apron
J-9-25	Apply Window Casing
J-9-26	Trim a Window

J-9-27	Determine Layout for Ceiling Tile
J-9-28	Install Furring Strips for Ceiling Tile
J-9-29	Install Ceiling Tile
J-9-30	Install Ceiling Moldings
J-9-31	Lay Out and Install Ceiling Tile on Furring
J-9-32	Lay Out and Install Main Runners For Suspended Ceiling
J-9-33	Install Cross T's
J-9-34	Install Ceiling Panels
J-9-35	Install Suspended Ceiling
J-9-36	Install Resilient Floor Tile
J-9-37	Lay Hardwood Flooring
J-9-38	Install Base Trim
J-9-39	Install Closet Trim and Shelving
J-9-40	Install a Threshold (Aluminum)
J-9-41	Make a Mortice and Tennon Joint
J-9-42	Make A Cross Lap Joint
J-9-43	Make a Reinforced Butt Joint
J-9-44	Make a Lipped Cabinet Door
J-9-45	Hang A Cabinet Door
J-9-46	Make a Cabinet Drawer
J-9-47	Install Roller Drawer Guides
J-9-48	Build Kitchen Base Cabinets
J-9-49	Build a Counter Top
J-9-50	Install Plastic Laminate
J-9-51	Build Wall Cabinets
J-9-52	Install Factory Made Cabinets

Skill Competencies and Information Lessons

The left hand column lists the tasks of the occupation which form the skill competencies required of the student. These competencies should be demonstrated by the teacher and practiced by the student.

The information lessons outline the general technical information and knowledge needed to perform the skill competencies. These items represent a common information taught on a group instruction basis. Additional information will emerge to be taught on an individual student basis as pupils work on the skill competencies.

The numbers preceding each title correspond to the identifying numbers of the operation sheets and the information sheets. The information lessons relate to the particular major unit of instruction but do not necessarily relate to corresponding skill competency numbers.

UNIT I. ORIENTATION

Skill Competencies/Operations The student will be able to:	Information Lessons	
	IL-1-1	History and Ethics of the Trade
	IL-1-2	Safety
	IL-1-3	Tools
	IL-1-4	Materials
	IL-1-5	Mathematics
	IL-1-6	Shop Organization
		This is only a list of topics from which lessons would be developed to fit each particular shop.

Unit II. Hand and Machine Tool Processes

Skill Competencies/Operations
The student will be able to:

SC-2-1	Lay Out Stock to Length
SC-2-2	Lay Out Stock to Width
SC-2-3	Cut Stock to a Line With a Handsaw
SC-2-4	Plane Edges with a Hand Plane
SC-2-5	Plane End of Stock With a Block Plane
SC-2-6	Chamfer and Bevel with Hand Plane
SC-2-7	Use a T-Bevel to Lay Out Duplicate Angle
SC-2-8	Sand Wood by Hand
SC-2-9	Drill Holes with a Hand Drill
SC-2-10	Bore Holes with Brace and Auger Bit
SC-2-11	Drill Holes with an Automatic Push Drill
SC-2-12	Drill Holes with an Electric Drill
SC-2-13	Drive and Remove Wood Screws With Screwdriver
SC-2-14	Drive or Remove Screws with a Spiral Screwdriver
SC-2-15	Clamp Pieces of Stock Face to Face
SC-2-16	Lay Out a 45^o Angle
SC-2-17	Cut with A Miter Box
SC-2-18	Lay Out Circles and Arcs
SC-2-19	Cut Curves with a Compass Saw
SC-2-20	Cut Curves with the Coping Saw

Information Lessons

IL-2-1	Occupational Safety and Health Act
IL-2-2	The Carpenter's Basic Tool Kit
IL-2-3	Systems of Measurement
IL-2-4	Lumber Dimensions and Grading
IL-2-5	Types, Care and Use of Marking and Measuring Tools
IL-2-6	Types, Care and Use of Hand Saws
IL-2-7	Care and Use of Hand Planes
IL-2-8	Selection and Use of Abrasives
IL-2-9	Types, Care and Use of Boring Tools
IL-2-10	The Safe Use of an Electric Drill
IL-2-11	Types and Sizes of Wood Screws
IL-2-12	Types and Uses of Tools Used for Assembly or Disassembly
IL-2-13	Types and Uses of Clamping Tools
IL-2-14	Types of Glue and Adhesive
IL-2-15	The Safe Use of a Sabre Saw
IL-2-16	Shaping and Forming Tools (Rasp, File, Surform and Scraper)
IL-2-17	Circular Saw Blades - Types and Use
IL-2-18	The Safe Use of a Table Saw
IL-2-19	The Safe Use of a Jointer
IL-2-20	The Safe Use of a Radial Arm Saw

Skill Competencies/Operations The student will be able to:	
SC-2-21	Use a Sabre Saw
SC-2-22	Shape Stock with a Wood Rasp
SC-2-23	Rip with the Table Saw
SC-2-24	Plane Edge of Stock with the Jointer
SC-2-25	Crosscut with Radial Arm Saw
SC-2-26	Make and Use a Pattern
SC-2-27	Drive Nails with a Claw Hammer
SC-2-27A	Pull Nails with the Claw Hammer
SC-2-27B	Pull Headless Nails with a Claw Hammer
SC-2-27C	Pull Nails with a Nail Puller
SC-2-28	Whet an Edge on a Plane Iron and Wood Chisel
SC-2-29	Grind a Plane Iron or Wood Chisel
SC-2-30	Cut a Gain with a Wood Chisel
SC-2-31	Lay Out Angles with a Framing Square
SC-2-32	Determine the Length of Braces or Trestle Legs
SC-2-33	Cut Simple or Compound Miter with a Handsaw
SC-2-34	Dado, Rabbet and Plow with Radial Saw
SC-2-35	Shape Edges of Stock with a Router
SC-2-36	Dado, Rabbet, or Plow with a Router

Information Lessons	
IL-2-21	Selection and Use of Nails
IL-2-22	Joints Used in Assembling Wood
IL-2-23	Care and Use of Impact Tools
IL-2-24	Sharpening and Maintaining Cutting Edges
IL-2-25	Cuts Made in Wood (Gain, Rabbet, Dado and Groove)
IL-2-26	Selection and Use of Chisels
IL-2-27	Safe Use of a Bench Grinder
IL-2-28	The Steel Square and the Right Triangle
IL-2-29	Laying Off Compound Angles
IL-2-30	The Safe Use of a Router
IL-2-31	The Safe Use of a Portable Sander
IL-2-32	Estimating Materials

Skill Competencies/Operations The student will be able to:		Information Lessons
SC-2-37	Use a Belt Sander	
SC-2-38	Use a Finishing Sander (Oscillating)	

Unit III. Building Layout

Skill Competencies/Operations The student will be able to:		Information Lessons	
SC-3-1	Rip with Radial Arm Saw	IL-3-1	Occupational Safety and Health Act
SC-3-2	Point Stakes with a Hatchet	IL-3-2	Building Restrictions and Zoning
SC-3-3	Drive Stakes with a Sledge	IL-3-3	Lot and Plot Plans
SC-3-4	Measure with a Steel Tape	IL-3-4	References Used in Stake-Out (Benchmark, Hubs, Elevations, etc.)
SC-3-5	Stretch and Attach Dryline to Stakes or Nails	IL-3-5	Site Preparation
SC-3-6	Set Up Builder's Level	IL-3-6	Safe Use of a Half Hatchet
SC-3-7	Measure or Layout Horizontal Angles with Builder's Level - Transit	IL-3-7	Right Triangle (Pythagorean Theory)
SC-3-8	Check for Level or Plumb with a Carpenter's Level	IL-3-8	Methods of Establishing Building Corners
		IL-3-9	Care and Testing of Hand Levels
		IL-3-10	Batter Boards and Their Function
		IL-3-11	Use and Care of the Builder's Level
		IL-3-12	Methods of Checking Squareness
		IL-3-13	Mathematics Related to Building Layout
		IL-3-14	Determining Elevations of Footings

Unit IV. Foundations and Concrete Forms

	Skill Competencies/Operations The student will be able to:
SC-4-1	Plumb With The Plumb Bob
SC-4-2	Use a Portable Circular Saw
SC-4-3	Cut Metal with a Hack Saw
SC-4-4	Snap Line With Chalkline
SC-4-5	Align Framing With Line and Blocks
SC-4-6	Taper Stock with Jointer
SC-4-7	Bevel or Chamfer With Jointer

	Information Lessons
IL-4-1	Occupational Safety and Health Act
IL-4-2	Safety During Construction
IL-4-3	Interpret Foundation Plan and Details
IL-4-4	Bearing Soils and Footer Dimensions
IL-4-5	Determine the Length of a Foundation Story Pole
IL-4-6	Interpret Specifications
IL-4-7	Concrete Mixes
IL-4-8	Handling Concrete
IL-4-9	Concrete Finishes
IL-4-10	Water Seals in Footers
IL-4-11	Controlling Hydrostatic Pressure on a Foundation
IL-4-12	Anchors and Keyways in Footers
IL-4-13	Use and Care of Ladders
IL-4-14	Cubic Measure
IL-4-15	Block and Poured Foundations
IL-4-16	Accident Prevention on the Job
IL-4-17	Opening Bucks in Concrete Walls
IL-4-18	Concrete Form Hardware
IL-4-19	Reinforcement Steel
IL-4-20	Types, Use Of and Spacing of Wall Ties
IL-4-21	Braces on a Concrete Wall Form

Skill Competencies/Operations The student will be able to:	Information Lessons	
	IL-4-22	Principals of Stair Construction
	IL-4-23	Placing, Finishing and Curing Concrete
	IL-4-24	Carpenter's Role in Block Masonry
	IL-4-25	Materials Used in Concrete Forms
	IL-4-26	Scaffold Safety

Unit V. Floor Framing

Skill Competencies/Operations The student will be able to:		Information Lessons	
SC-5-1	Assemble Framing Members by Toenailing	IL-5-1	Occupational Safety and Health Act
SC-5-2	Bevel With Radial Arm Saw	IL-5-2	Types of Wood Framing
		IL-5-3	Identification of Framing Parts (Floor Framing)
		IL-5-4	Grade, Size and Species of Framing Lumber
		IL-5-5	Reading Floor Plans
		IL-5-6	Interpreting Wall Section Drawing
		IL-5-7	Fastening Framing Ladder
		IL-5-8	Types of Girders
		IL-5-9	Types of Columns
		IL-5-10	Spacing Framing Members
		IL-5-11	Openings in Floor Framing
		IL-5-12	Determining Sizes of Framing Members
		IL-5-13	Methods of Framing Joists at Girders and Beams
		IL-5-14	Framing Methods for Masonry Construction
		IL-5-15	Calculate Stairway Tread, Riser and Headroom Dimensions
		IL-5-16	Bridging
		IL-5-17	Types of Sub-Flooring
		IL-5-18	Safety at the Construction Site

Unit VI. Wall Framing

Skill Competencies/Operations The student will be able to:		Information Lessons	
SC-6-1	Lay Out Pattern for Ceiling Joists	IL-6-1	Occupational Safety and Health Act
		IL-6-2	Framing Parts Identification (Wall Framing)
		IL-6-3	Wall Section Drawings
		IL-6-4	Spacing Framing (Review)
		IL-6-5	Corner Posts
		IL-6-6	Nails and Fasteners Used in Framing
		IL-6-7	Reading Opening Schedules
		IL-6-8	Calculate Rough Opening Dimensions
		IL-6-9	Header Depths
		IL-6-10	Application of a Plumb Bob
		IL-6-11	Using a Gage Line
		IL-6-12	Blocking and Grounds Needed
		IL-6-13	Bearing and Non-Bearing Structure Components
		IL-6-14	Provisions for Mechanical Facilities
		IL-6-15	Estimating Number of Pieces Needed in Framing
		IL-6-16	Kinds and Application of Wall Sheathing
		IL-6-17	Kinds of Scaffolding
		IL-6-18	Scaffold Accident Prevention
		IL-6-19	Methods of Constructing Wooden Scaffolds

Unit VII. Roof Framing

Skill Competencies/Operations The student will be able to:		Information Lessons	
SC-7-1	Lay Out Plumb Cut and/or Level Cut on Common Rafter	IL-7-1	Occupational Safety and Health Act
SC-7-2	Miter with a Radial Saw	IL-7-2	Roof Types and Terminology
SC-7-3	Make A Compound Cut With Radial Saw	IL-7-3	Reading Elevation and Roof Framing Plans
		IL-7-4	Right Triangle and Roof Framing
		IL-7-5	Application of the Framing Square to Common Rafters
		IL-7-6	Use of the Rafter Framing Tables
		IL-7-7	Shortening of a Rafter
		IL-7-8	Rafter Spacing
		IL-7-9	Laying Out Odd Units of Run
		IL-7-10	Estimating Material Needed for Gable Roof Framing
		IL-7-11	Temporarily Bracing a Roof Assembly
		IL-7-12	The Difference Between a Common and a Hip Rafter
		IL-7-13	Steel Square Rafter Table Pertaining to Hip Rafters
		IL-7-14	Calculate Hip Length Mathematically
		IL-7-15	Determining Cheek Cuts
		IL-7-16	Steel Square Rafter Tables Pertaining to Jack Rafters
		IL-7-17	Advantages of Roof Trusses
		IL-7-18	Roof Truss Construction
		IL-7-19	Fabricated Metal Fasteners (Stirrups, Splice Plates, Etc.,)
		IL-7-20	Safety Procedures

Unit VIII. Exterior Finish

Skill Competencies/Operations The student will be able to:	
SC-8-1	Set Finish or Casing Nails
SC-8-2	Cut Heavy Metal with Hack Saw
SC-8-3	Cut Thin Metal With Tin Shears
SC-8-4	Lay Out and Make Mitered Joints in Moldings
SC-8-5	Make a Coped Joint
SC-8-6	Mark Siding to Length with a Siding Hook
SC-8-7	Scribe an Irregular Surface with Wing Dividers or Scriber
SC-8-8	Toenail Tongue and Groove Flooring
SC-8-9	Cut Window Glass
SC-8-10	Glaze a Window
SC-8-11	Use A Caulking Gun

Information Lessons	
IL-8-1	Occupational Safety and Health Act
IL-8-2	Lumber and Millwork for Exterior Finish (Grades and Species)
IL-8-3	Handling and Storage of Finish Lumber
IL-8-4	Fasteners for Exterior Finish
IL-8-5	Types of Joints Used in Exterior Finish
IL-8-6	Kinds of Cornices and Their Parts
IL-8-7	Prefabricated Cornice Materials
IL-8-8	Kinds of Molding
IL-8-9	Cutting Angles on Moldings
IL-8-10	Kinds of Flashing
IL-8-11	Kinds of Metal and Their Fasteners
IL-8-12	Roof Coverings
IL-8-13	Aligning Roof Covering Courses
IL-8-14	Finish a Roof (Caps)
IL-8-15	Wood Shingle Treatment
IL-8-16	Wall Flashings
IL-8-17	Interpret an Opening Schedule (Review)
IL-8-18	Kinds of Doors and Frames
IL-8-19	Kinds of Windows and Their Parts
IL-8-20	Overhead Doors

Skill Competencies/Operations The student will be able to:	Information Lessons	
	IL-8-21	Types of Siding
	IL-8-22	Metal and Plastic Siding
	IL-8-23	Accident Prevention in Cutting and Handling Sheet Metal
	IL-8-24	Siding Accessories
	IL-8-25	Application of Siding
	IL-8-26	Prefinished Composition Siding
	IL-8-27	Scaffolding (Review)
	IL-8-28	Deck Covering (Leaded Canvas)
	IL-8-29	Anchoring Wood or Metal To Masonry
	IL-8-30	Preservative Treatment for Exterior Wood Work
	IL-8-31	Construction Adhesives

Unit IX. Interior Finish

Skill Competencies/Operations
The student will be able to:

SC-9-1 Lay Out With Scribers
SC-9-2 Mark for a Hinge Gain with a Butt Gage

Information Lessons

IL-9-1 Occupational Safety and Health Act
IL-9-2 Correct Handling and Storage of Finish Materials
IL-9-3 Rigid Insulation
IL-9-4 Flexible Insulation
IL-9-5 Principles of Lath and Plaster Application
IL-9-6 Gypsum Wallboard Application and Methods
IL-9-7 Grades and Sizes of Finish Lumber
IL-9-8 Board Paneling Patterns and Dimensions
IL-9-9 Plywood and Composition Paneling
IL-9-10 Types of Floor Underlament
IL-9-11 Interpreting Opening Schedules
IL-9-12 Kinds of Moldings used in Interior Finish
IL-9-13 Method of Trimming Door Frames
IL-9-14 Care and Use of a Miter Box
IL-9-15 Method of Trimming Window Frames
IL-9-16 Interior Doors (Kinds and Designs)
IL-9-17 Door Hardware
IL-9-18 Types of Locksets
IL-9-19 Ceiling Tile
IL-9-20 Suspended Ceiling Systems

Skill Competencies/Operations The student will be able to:		Information Lessons
	IL-9-21	Interior Woodworking Finishes
	IL-9-22	Interpreting Opening Schedules
	IL-9-23	Wall Finishes
	IL-9-24	Pre-Fab Cabinets
	IL-9-25	Plastic Laminates
	IL-9-26	Composition Wall Coverings (Marlite, Etc.)
	IL-9-27	Wood Joints Used in Cabinetmaking

WRITTEN INSTRUCTIONAL AIDS

Introduction

Instruction sheets are aids used in developing the most effective and efficient teaching-learning situation that is possible. Four types of sheets are generally used including job sheets, operation sheets, information sheets and assignment sheets.

JOB SHEETS indicate to the student what to do in performing the various jobs assigned by the instructor. The jobs that will be used as vehicles of instruction in the course are listed in the COURSE OUTLINE section.

The job involves a sequential performance of operations by the learner to "tryout" and develop the skill competencies (operations) of the occupation resulting in a product or service. It is the vehicle of instruction or the media by which the student practices and develops a series of skill competencies (operations).

OPERATION SHEETS supplement the job sheets and indicate to the student how to perform the many skill competency operations necessary to complete the assigned jobs. The operations that will be taught in the course are listed in the COURSE OUTLINE section under skill competencies/operations. The operation sheets should be numbered to correspond with the Skill Competencies listed in the course outline.

Operations are the subdivision in the breakdown of a job. Each operation represents a process, way of doing or how to perform the particular skill competency or operation.

INFORMATION SHEETS supplement the job sheets and provide the student with information necessary for completing the assigned jobs with highest possible degree of understanding. The information units that will be stressed in the course are listed in the course outline under information lessons. The information sheets included in this section should be numbered to correspond with the Information Lessons listed in the course outline.

ASSIGNMENT SHEETS supplement the job sheets and provide the student with mental activities necessary to learn the "knowing" that accompanies the "doing" of a trade. The student is assigned related studies or technical information to be "sought out" on an individual basis through the use of problems or "exercises". The Assignment Sheets should be numbered to correspond with the Information Lessons listed.

JOB: Lay Out Stock to Length

JOB SHEET IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-1

COURSE: Carpentry

MATERIAL: 1 Piece, White Fir Construction Grade, 2 X 4 X 2'-0"

TOOLS: Combination Square
Pencil
Rule

COMPETENCE- PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Get stock from the storage bin.	
2. Starting at one end, measure and mark the following dimensions on one side of the 2 X 4: 1" 1 1/2" 2 1/4" 3 1/8" 4 1/16" 4 3/4" 5 3/8" 6 3/16" 6 7/8" 7 5/16" 8 5/8" 9 7/16" 10 1/4" 11 9/16" 12 11/16" 13 13/16" 14 15/16" 15 1/16" 16" 17 1/4" 18 3/16" 19 15/16" 20 11/16" 21 3/8" 22 11/16" 23 1/2"	. SC-2-1
3. Use a combination square to square lines through all the marks and across the face of the board.	
4. Extend all lines across both edges of the 2 x 4.	NOTE: Have the work checked. NOTE: Keep the material for J-2-3.

METHOD OF EVALUATION:

Check accuracy of layout.

JOB: Lay Out Stock to Width

JOB SHEET
IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

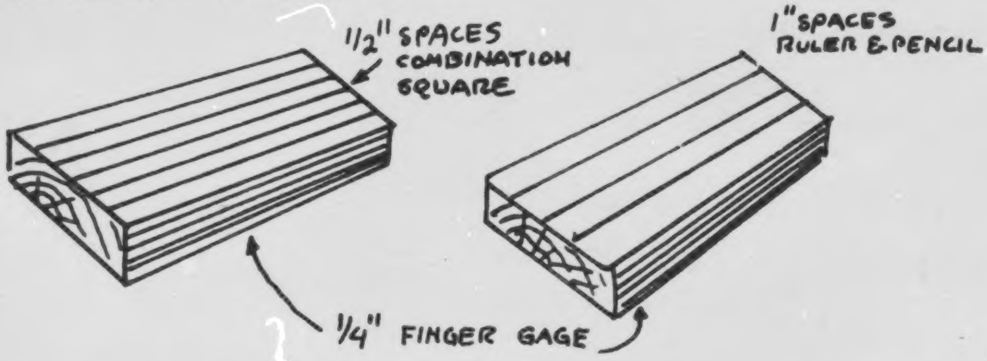
JOB NUMBER: J-2-2

COURSE: Carpentry

MATERIAL: 1 Piece - White Pine, #2, 3/4" x 3 1/2" x 12"

TOOLS: Combination Square
Pencil
Rule

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Mark off the width of the stock into 1/2" spaces.	. IL-2-3, SC-2-2
2. With the combination square, gage lines through the marks, parallel to the edge of the stock.	
3. Turn the board over and use a rule and pencil to gage lines parallel to the edge of the board at 1" intervals.	. SC-2-3
4. On the edges of the stock, finger gage lines spaced at 1/4" intervals.	. SC-2-4



METHOD OF EVALUATION:

Check accuracy of layout.

JOB: Cut To Length With a Hand Saw

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: White Fir, 2 X 4 from J-2-1

TOOLS: Crosscut Saw--9 Point

EQUIPMENT: Saw Horse
Bench Vise

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-3

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place the 2 x 4 on a saw horse and cut to the lines marked on the 2 x 4.	. IL-2-5, SC-2-3
2. Starting with the 23 1/2" mark, cut to each line until 8 5/8" remains.	. SC-2-3
3. Have work checked after each cut is made.	NOTE: The small pieces being removed as each cut is made will be the waste. This means the pencil lines should remain on the larger piece after the cut is made.
4. When the 8-5/8" mark has been reached, clamp the material in a bench vise and cut to the remaining lines until only 2 1/4" remains.	

METHOD OF EVALUATION:

1. Instructor will observe student's techniques.
2. Accuracy of cuts.
3. Squareness of cuts.

JOB: Cut To Width With a Hand Saw

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece, 1 X 12 X 1'4", #2 White Pine

EQUIPMENT: Saw Horse or Bench Vise

TOOLS:
5 1/2 Point Rip Saw
Rule
Pencil

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-4

SAFETY PRECAUTIONS:

Follow all safety rules for using hand tools, especially when starting to make the cut.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set combination square to 2 1/8". Gage a pencil line along one edge of the stock.	NOTE: The extra 1/8" is to allow for planing the edge smooth after ripping.
2. Place stock on saw horse or clamp it in a vise.	NOTE: With thumb as guide use short easy strokes to start the saw cut.
3. With a hand rip saw, saw along pencil line just made. Be sure to cut on waste side of line.	. IL-2-5 . SC-2-3 . Stanley Tool Guide NOTE: Save material for future jobs.

METHOD OF EVALUATION:

Work will be checked for squareness with the face of the stock and evenness along the gage line.

JOB: Plane the Edge Grain of Wood

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Stock from J-2-4

EQUIPMENT: Bench Vise or Saw Horse

TOOLS: Hand Rip Saw
Jack Plane
Rule
Pencil

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-5

SAFETY PRECAUTIONS:

Follow all safety rules for using hand tools--especially sharp-edged tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set the combination square to 8 1/2". Gage a pencil line along one edge of the stock.	. SC-2-2
2. Saw to this line. Cut close to the line and on the waste side.	. SC-2-3
3. Clamp the stock in a vise with the edge to be planed up.	
4. Adjust the jack plane.	Stanley Tool Guide #13 and #14
5. Plane the edge of the stock to the gage line until the edge of the stock is smooth, straight and square with the face.	. SC-2-4 NOTE: Plane parallel to the gage line. Check ocassionally to make sure the edge is straight and square with the face of the stock.

METHOD OF EVALUATION:

Work will be checked for neatness, straightness and squareness.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-6

JOB: Plane the End of Stock

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Stock from J-2-5

EQUIPMENT: Bench Vise

TOOLS:
Crosscut Handsaw
Block Plane
Rule
Pencil

SAFETY PRECAUTIONS:

Observe all safety rules for using hand tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Measure from one end of the stock and mark a distance of 1/2".	. SC-2-1
2. Square across the face of the stock at this mark.	. SC-2-1
3. Square across both edges at the same distance and across the opposite face of the stock.	
4. Clamp stock in vise and cut off the stock. Saw on the waste side of the line.	. SC-2-3
5. Clamp the stock in a vise and adjust the block plane.	. SC-2-5
6. Plane the end grain until it is smooth and square with the face and edges of the stock.	Stanley Tool Guide #18 NOTE: Plane in toward the center of the stock from both edges as shown in the tool guide.

METHOD OF EVALUATION:

Work will be checked for neatness and for squareness with the face and edges of the stock.

JOB: Chamfer Corners of Stock

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Stock from J-2-6

EQUIPMENT: Bench Vise

TOOLS: Block Plane
Rule
Pencil

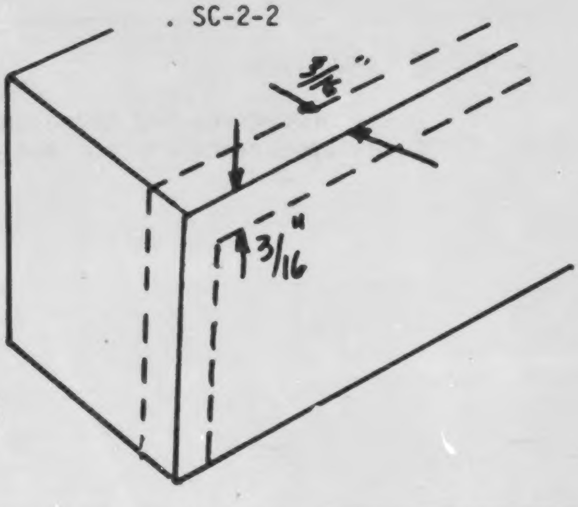
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-7

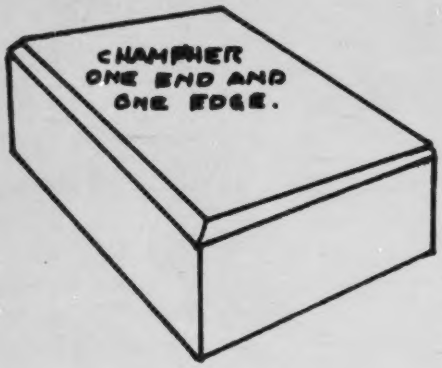
SAFETY PRECAUTIONS:

Observe all hand tool safety rules especially for sharp-edged tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check one end of the stock for square with the face and edge.	. SC-2-3
2. From this end, measure 1'-3" and make a pencil mark.	. SC-2-4 Stanley Tool Guide #18
3. Square around the stock at this length.	. SC-2-2
4. Cut off the stock to this length using 10 pt. hand saw.	
5. Clamp the stock in a vise. Plane the edges and ends smooth, straight and square with the face.	. SC-2-5
6. Measure and mark a distance of 3/16" in from the corner on both the face and edge along one side and one end as shown.	
7. Pencil gage a line through each of these points parallel to the edge. See sketch.	. SC-2-2
8. Adjust the block plane.	



9. Plane off the corner of the stock to the gage line on each side of the corner.



NOTE: The final cut should be continuous from one end to the other and just to each gage line to produce a nice smooth, even chamfer.

. SC-2-6

METHOD OF EVALUATION:

1. Check procedures and techniques.
2. Check appearance of finished job.

JOB: Bevel the Edge of Stock

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Stock from J-2-7

EQUIPMENT: Bench Vise

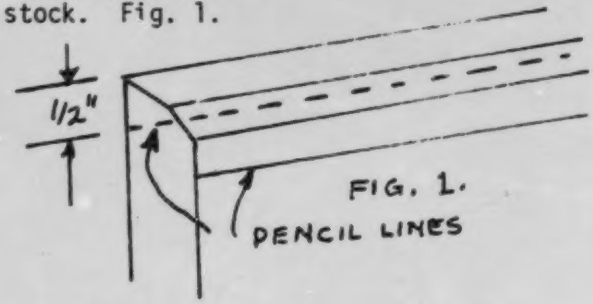
TOOLS: Jack Plane
Sliding T-Bevel
Rule and Pencil

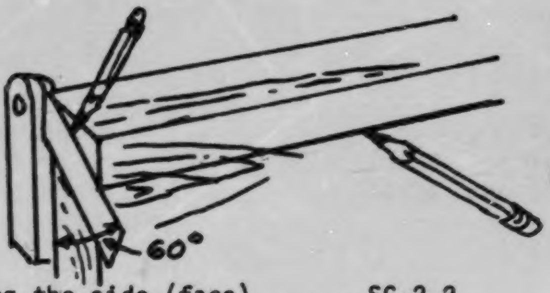
JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-8

SAFETY PRECAUTIONS:

Observe all hand tool safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set the combination square to 1/2" and gage a line 1/2" from the edge on both faces (sides) of the stock. Fig. 1.  FIG. 1. 	. SC-2-2
2. Use a hand rip saw and cut the edge of the stock square to these lines.	. SC-2-3 . SC-2-4 NOTE: A jack plane could be adjusted and used to plane the stock down to these lines so the edge of stock is straight and square.
3. Set T-bevel to an angle.	. SC-2-7 NOTE: See Stanley Tool Guide #30.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
4. Mark a 60 degree angle on the end of the stock as shown in Fig. 2.  FIG. 2.	. SC-2-7
5. Gage a pencil line along the side (face) of the stock parallel to the edge as shown.	. SC-2-2
6. Adjust the jack plane and plane the stock down to the pencil gaged line and upper corner to form a bevel.	. SC-2-6

METHOD OF EVALUATION:

Work will be checked for neatness and the accuracy of 60° bevel.

JOB: Sand Wood By Hand

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: From J-2-8
Medium and Fine Sandpaper, One Sheet Each

EQUIPMENT: Bench Vise

TOOLS: Rubber Sanding Block

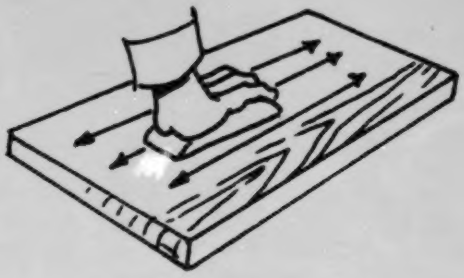
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-9

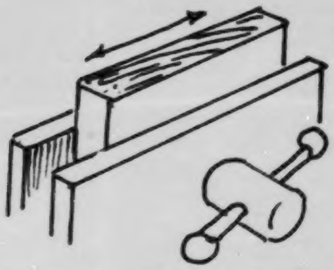
SAFETY PRECAUTIONS:

1. Observe all hand tool safety rules.
2. Look out for splinters.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut a piece of medium sandpaper to size. Insert it in a sanding block. 2. Sand all sides and edges with the grain. 3. Sand end grain across the width of the stock. 4. Cut a piece of fine sandpaper to size. Install it in a sanding block. 5. Repeat steps 2 thru 4 above using fine sandpaper.	NOTE: Keep the sanding block flat against the surface of the wood. Do not allow edges and ends to round over.



. SC-2-8



METHOD OF EVALUATION:

Work will be checked for smoothness and flat surfaces.

JOB: Drill Holes With a Hand Drill

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

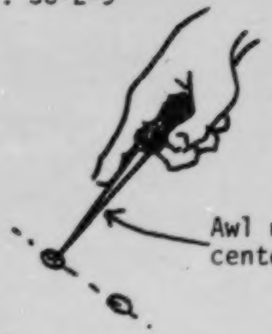
MATERIAL: Material from J-2-2

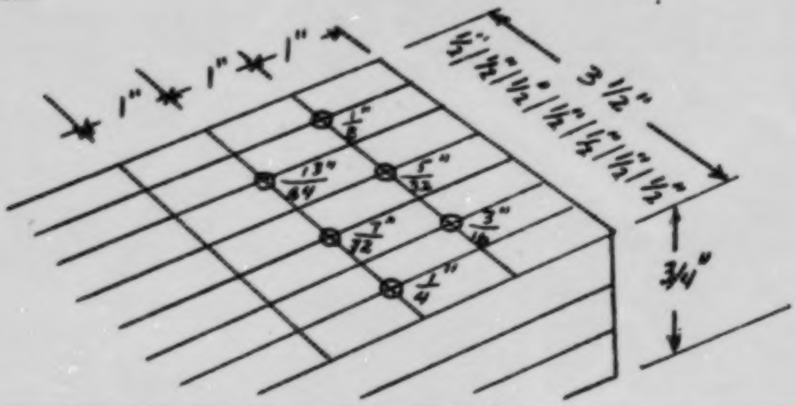
TOOLS: Hand Drill
Twist Drill Bits

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-10

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Square lines across the face of the stock to locate the centers of all holes.	. SC-2-9
2. Mark the center of each hole with a scratch awl.	
3. Clamp material in a bench vise so drilling is done in a horizontal direction.	
4. Use a hand drill and the correct size twist drill to drill holes as indicated on the sketch.	


Awl used to mark centers.



METHOD OF EVALUATION:

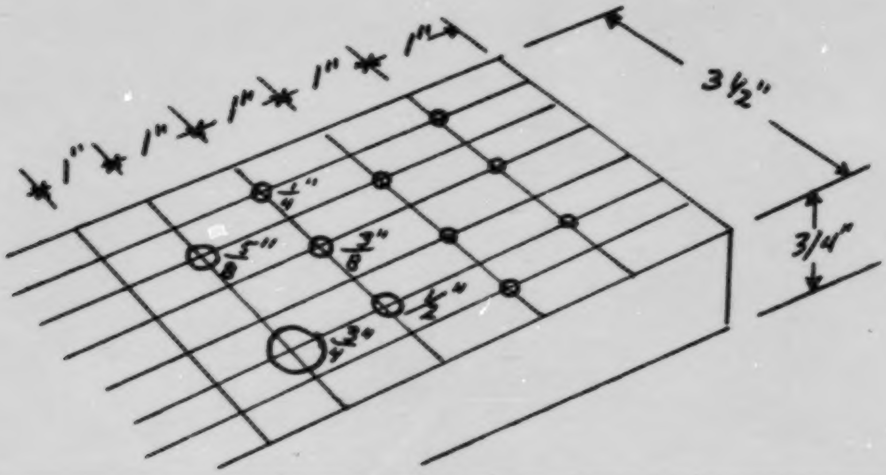
1. Accuracy of layout
2. Holes drilled without splintering
3. Holes drilled squarely through stock
4. Proper procedure

JOB:	Drill Holes With a Brace and Bit
UNIT II:	Hand and Machine Tool Processes
COURSE:	Carpentry
MATERIAL:	Material from J-2-10
TOOLS:	Brace Auger Bits

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-11

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Locate the centers of the holes.	NOTE: All holes are to be bored without splintering the back of the stock.
2. Clamp material in a bench vise so drilling will be done in a horizontal direction.	Stanley Tool Guide #26
3. Use a brace and auger bits to bore holes as indicated on sketch.	. SC-2-10



METHOD OF EVALUATION:

1. Accuracy of layout
2. Holes drilled without splintering
3. Holes drilled squarely through stock
4. Proper procedure

JOB: Drill Holes With a Push Drill

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Material from J-2-11

TOOLS: Push Drill

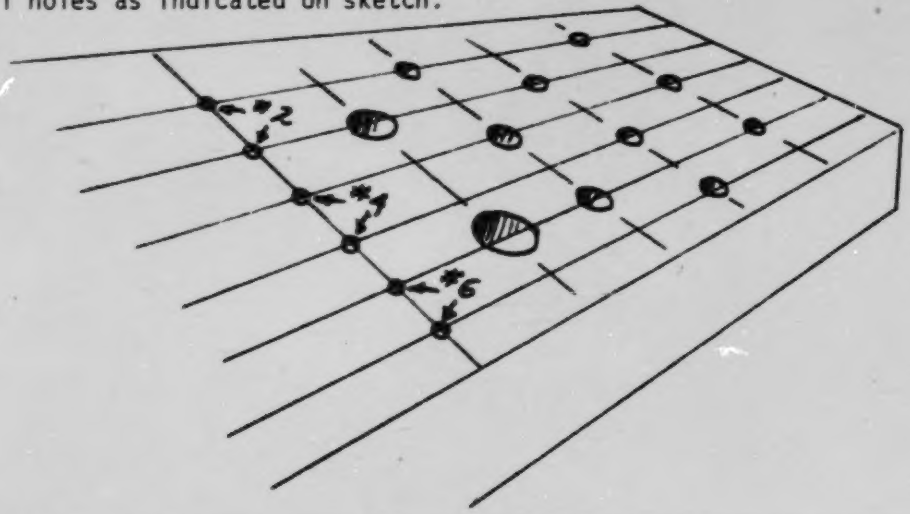
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-12

SAFETY PRECAUTIONS:

Keep your fingers away from the drill point.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Locate the centers of the holes.	NOTE: Do not splinter the back of the stock.
2. Clamp the material in a bench vise with a piece of scrap (to prevent splintering) back of stock. Drilling should be in a horizontal direction.	
3. Use the push drill and correct drill points to drill holes as indicated on sketch.	. SC-2-11



METHOD OF EVALUATION:

1. Accuracy of layout
2. Holes drilled without splintering
3. Holes drilled squarely through stock
4. Proper procedure

JOB: Drill Holes With an Electric Drill

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Material From J-2-12

TOOLS:
1/4" Electric Drill
3/8" Electric Drill
Twist Drill Bits as Needed
Spade Bits as Needed
Screw-mate Drill and Countersink

JOB SHEET IDENTIFICATION CODE

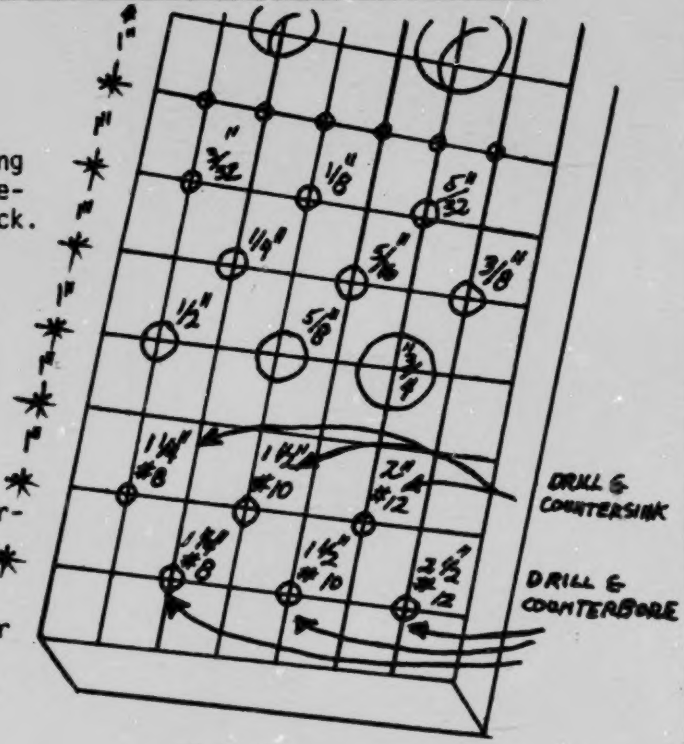
JOB NUMBER: J-2-13

SAFETY PRECAUTIONS:

Observe all safety rules for operation of power tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Locate the centers of the holes.
2. Mark hole centers with scratch awl.
3. Clamp the material in bench vise along with a piece of scrap material to prevent splintering the back of the stock. Drill in horizontal direction.
4. Use the 1/4" electric drill to drill all holes 1/4" or less in diameter.
5. Use the 3/8" electric drill to drill all holes larger than 1/4" in diameter.
6. Use the screw-sink (drill and countersink) bits to drill holes for screws as indicated on sketch.
7. Use the combination drill and counter bore bits to drill holes for wood screws as indicated on drawing. All holes are to be counterbored to a depth of 1/4".



. SC-2-12

METHOD OF EVALUATION:

1. Accuracy of layout
2. Holes drilled without splintering
3. Holes drilled squarely through stock
4. Proper procedure

JOB: Assemble Wood Members With Screws

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-14

MATERIAL:
1 Piece - 1 X 4 x 10"
1 Piece - 2 X 4 X 10"
4 Flathead Wood Screws, 2" X #8

TOOLS:
Combination Drill and Countersink Bits
1/4" Electric Drill

SAFETY PRECAUTIONS:

Observe all safety rules concerning use of hand tools and power tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
To assemble pieces as in Fig. 1:	
1. Lay out and cut the stock to length.	. SC-2-1
2. Locate the centers of the holes to be drilled.	. SC-2-3
3. Arrange the pieces as shown in Fig. 1 and drill the holes for 2" x #8 flathead woodscrews.	. SC-2-2 NOTE: One screw at each end will secure the pieces while other holes are being drilled and screws are being driven.
4. Assemble the pieces by driving the screws with a standard screwdriver.	. SC-2-13 NOTE: See Stanley Tool Guide #21

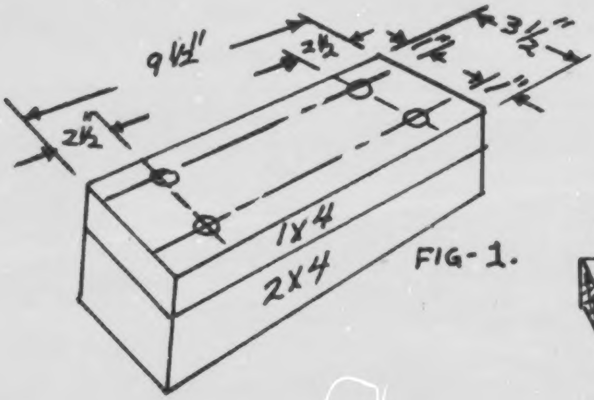
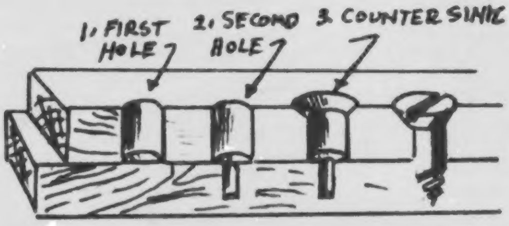


FIG-1.



NOTE: Have your work checked.

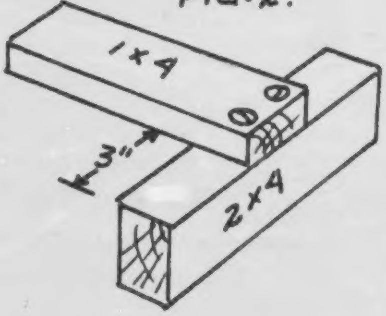
COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

To assemble pieces as in Fig. 2:

1. Remove the screws.
2. Arrange the pieces as shown in Fig. 2 (have the edge of the 1 X 4 square with the face of the 2 X 4). Drill the holes for the 2" X #8 woodscrews.
3. Assemble pieces by driving screws with a standard screwdriver.

FIG. 2.

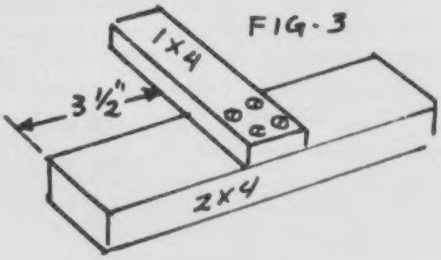


NOTE: Have your work checked.

To assemble pieces as shown in Fig. 3:

1. Use the holes which have already been drilled to assemble pieces as shown in Fig. 3, (have the edge of the 1 X 4 square with the edge of the 2 X 4).

FIG. 3



NOTE: Have your work checked.

NOTE: Save the material for the next job.

METHOD OF EVALUATION:

1. Alignment of pieces on edges and ends
2. Assembly for tight joint
3. Accuracy of layout and assembly
4. Selection of screwdriver
5. Use and care of tools

JOB: Assemble Wood Members With Wood Screws and Spiral Screwdrivers

JOB SHEET IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-15

COURSE: Carpentry

MATERIAL: From J-2-14

TOOLS: Spiral Ratchet Screwdriver

SAFETY PRECAUTIONS:

1. Observe safety rules for using screwdriver.
2. Be especially careful of the spring loaded spiral screwdriver.
3. Do not point it at anyone.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Insert the correct size screwdriver bit into the spiral screwdriver chuck.	. SC-2-14
2. Set the ratchet switch to reverse.	NOTE: See Stanley Tool Guide #22.
3. Carefully remove all the wood screws from the stock used in J-2-14.	NOTE: Use care so the screwdriver bit does not leave the screw slot and mar the wood.
4. Set the ratchet switch to the forward position.	NOTE: Be careful not to mar the screw heads.
5. Reassemble the pieces in all positions shown in J-2-14. Use the spiral ratchet screwdriver to drive the screws.	NOTE: Have your work checked after each assembly.

METHOD OF EVALUATION:

1. Alignment of pieces on edges and ends
2. Check assembly for tight joint
3. Accuracy of layout and assembly
4. Selection of screwdriver
5. Use and care of tools

JOB: Clamp Pieces of Stock Face to Face With C-Clamps and Hand Screws

JOB SHEET IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-16

COURSE: Carpentry

MATERIAL:
2 Pieces, 2 X 4 X 6"
2 Pieces, 2 X 6 X 1'6"
2 Pieces, 1 X 6 X 12"
2 Pieces, Plywood (Approximately 16" Square)
2 Pieces, 2 X 4 X 1'6"
(All Material Reuseable)

TOOLS:
6" C-Clamps
3--#1 Hand Screws
2--#0 Hand Screws

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Clamp the 2 X 4's face to face with c-clamps.	. SC-2-15
2. Clamp the 2 X 6's face to face with the #1 hand screws.	. SC-2-15
3. Clamp the 1 X 6 face to face with #0 hand screws.	
4. Clamp the pieces of plywood face to face with c-clamps.	NOTE: Have your work checked.

METHOD OF EVALUATION:

Check pieces after assembly.

JOB SHEET
IDENTIFICATION CODE

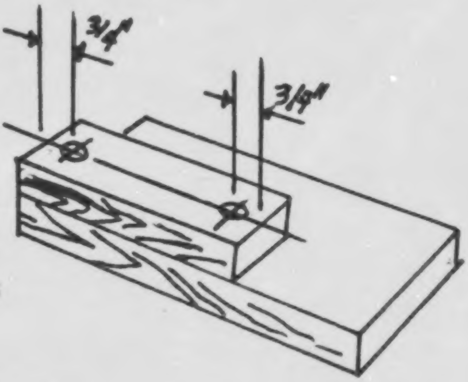
JOB NUMBER: J-2-17

JOB:	Assemble Wood Using Glue
UNIT II:	Hand and Machine Tool Processes
COURSE:	Carpentry
MATERIAL:	White Glue 1 X 4 X 6" White Pine 1 X 2 X 3" White Pine
TOOLS:	1/4" Electric Drill Drill and Countersink Bits

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

1. Select the proper size and type clamp.
2. Arrange the pieces as shown in drawing.
3. Clamp the pieces together.
4. Drill holes for the screws.
5. Remove the clamps.
6. Apply a thin layer of glue to the surfaces of the pieces to be joined.
7. Align the pieces and clamp them together.
8. Drive the screws.



NOTE: Remove excess glue with a damp cloth.

METHOD OF EVALUATION:

Inspect finished job.

JOB: Make a Bench Hook

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece 1" x 12" x 1'-2", #2 White Pine
6 - 1 1/4" x #10 Flat Head Wood Screws

EQUIPMENT: Bench Vise
Saw Horse

TOOLS: Hand Saw (10 Point Crosscut)
Combination Square
Jack Plane
Block Plane
Countersink
Hand Drill
Screwdriver
Rule and Pencil
3/16" Drill Bit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-18

DRAWING NO: D-2-18

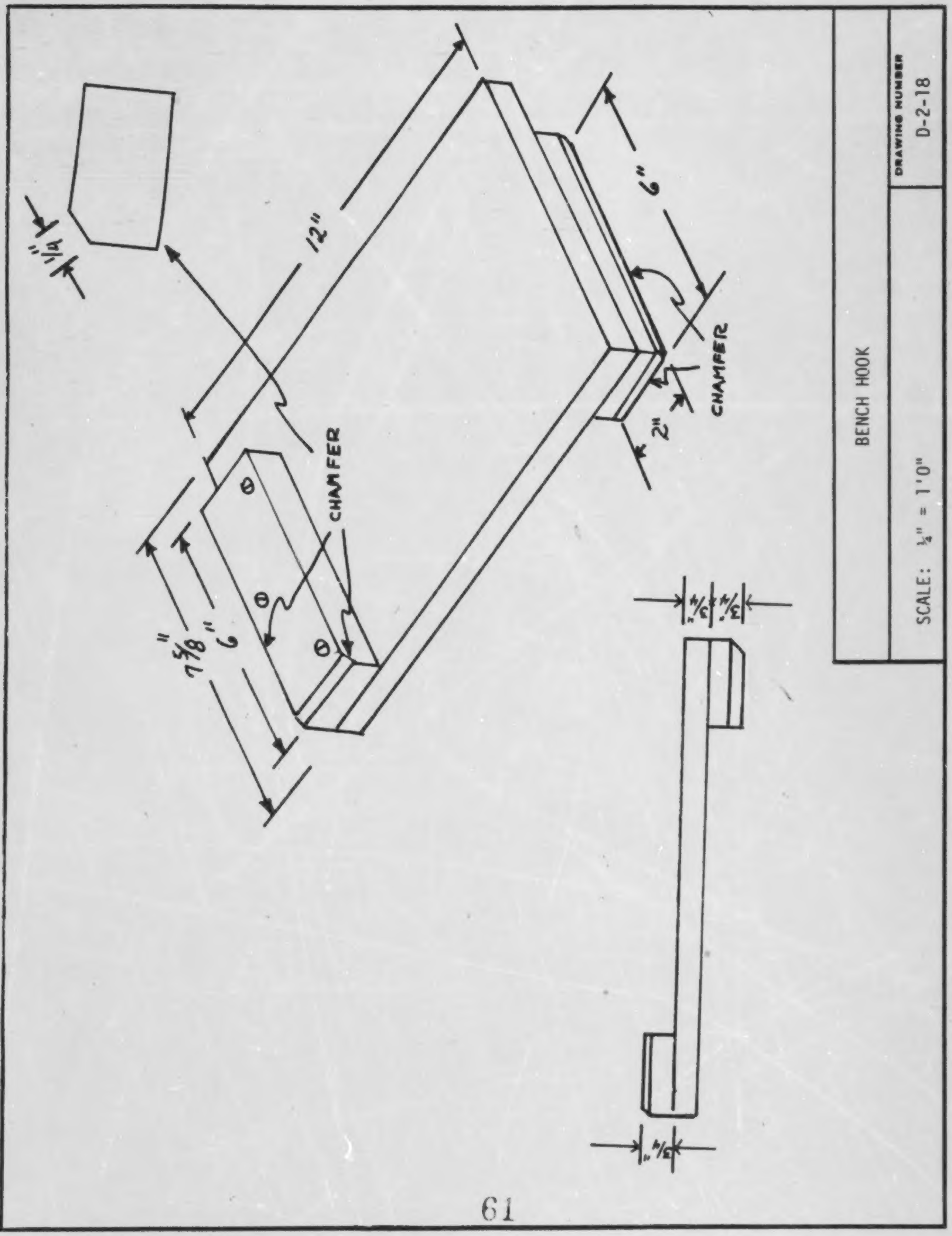
SAFETY PRECAUTIONS:

Observe all the safety rules for hand tools and be safety conscious.

COMPETENCE- PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare one piece of stock 3/4" X 7 5/8" x 12.	
2. Prepare two pieces 3/4" x 2" x 6".	
3. Lay out and drill 3/16" holes through both 6" pieces and countersink them as shown on the drawing.	
4. Lay out and chamfer one end and one edge of both 6" pieces. See the drawing.	
5. After all the edges and ends are planed square and smooth and carefully sanded, assemble the pieces as shown in the drawing. Use glue and screws.	

METHOD OF EVALUATION:

Job will be checked for accuracy of dimensions, squareness and neatness.


12"
6"
2"
1/4"
7 5/8"
6"
CHAMFER
CHAMFER
CHAMFER
3/4"
3/4"
5/8"
BENCH HOOK
SCALE: 1/4" = 1'0"
DRAWING NUMBER
D-2-18

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-19

JOB: Lay Out 45° Angles

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece 1" x 6" x 6'-0", #2 White Pine

EQUIPMENT: Bench Vise

TOOLS:
Framing Square
Combination Square
Try Square
T-Bevel
Rule and Pencil
Protractor

SAFETY PRECAUTIONS:

Observe all hand tool safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out a 45° angle near one end of the stock using the 45° shoulder on the combination square.	. SC-2-16, step 1
2. Lay out a 45° angle near to the first one using two figures such as 8" and 8" or 12" and 12" on the framing square.	. SC-2-16, step 2
3. Next lay out a 45° angle using the try square.	. SC-2-16, step 3
4. Finally lay out a 45° angle using the T-bevel and a protractor.	. SC-2-7

METHOD OF EVALUATION:

Angles will be checked for accuracy and method obtained.

JOB: **Make a Miter Box**

JOB SHEET
IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-20

COURSE: Carpentry

DRAWING NO: D-2-20

MATERIAL:
1 Piece, White Pine, #2, 1 X 6 X 6'0" from J-2-19
8 Woodscrews, FH, Steel 1 3/4" X #8
80 Grit and 100 Grit Abrasive Papers

EQUIPMENT:
Electric Drill
Hand Screws
C-Clamps
Miter Box

TOOLS:
Pencil
Crosscut Saw (10 Point)
Jack Plane
Rule
Combination Square
Ripsaw
Block Plane

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Square up the pieces for the sides and bottom.	. SC-2-1 through SC-2-5
2. Sand all flat surfaces.	. SC-2-8
3. Clamp the sides to the bottom and drill for woodscrews.	
4. Mark the position of each piece in the total assembly.	
5. Disassemble and apply a thin layer of glue to one side piece and one edge of the bottom.	
6. Fasten the first side to bottom with woodscrews.	. SC-2-13
7. Repeat step 3 and 4 for the second side.	
8. Lay out and cut a 90^{0} slot to within 1/8" of the bottom.	. SC-2-17
9. Lay out and cut 45^{0} slots to within 1/8" of the bottom.	. SC-2-17
10. Sand the entire miter box.	. SC-2-8

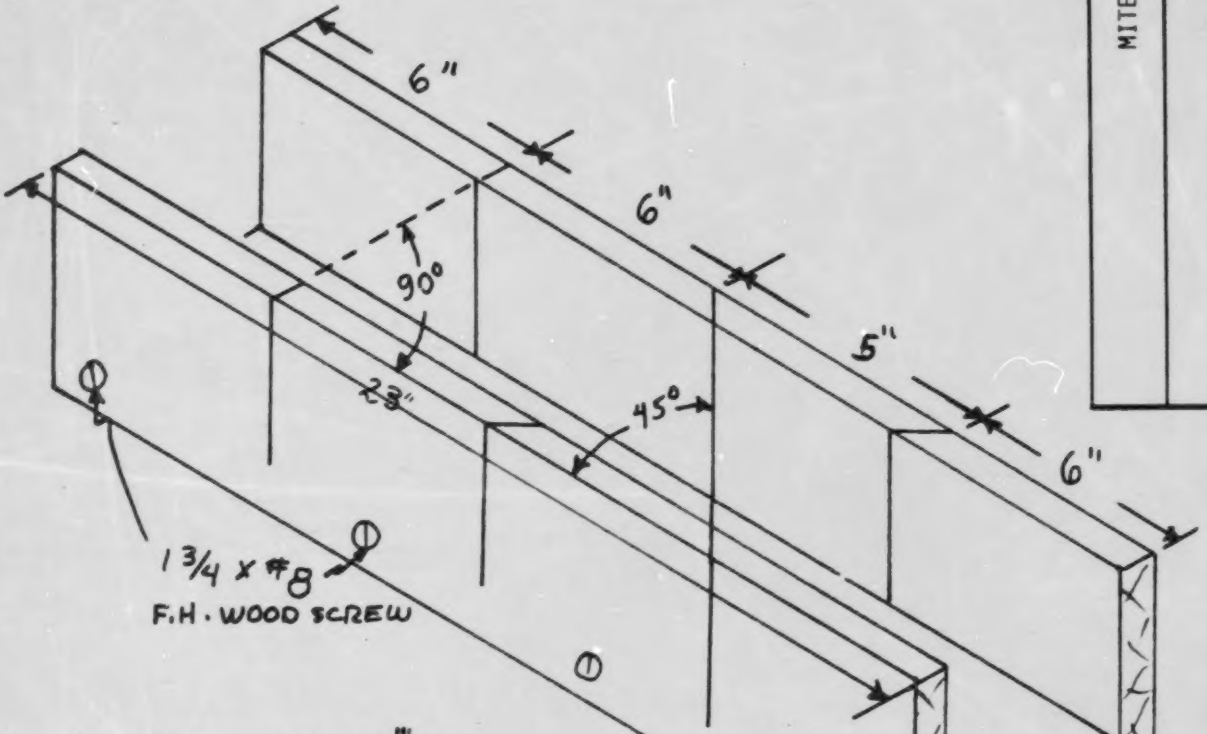
METHOD OF EVALUATION:

1. Safety
2. Procedures
3. Accuracy
    a. overall dimensions
    b. layout and cutting of slots
4. Appearance of finished product
5. Use and care of tools

DRAWING NUMBER

D-2-20

MITER BOX


6"
6"
5"
6"
90°
23"
45°
1 3/4 x #8
F.H. WOOD SCREW
①
①
3/4"
3 1/2"
3/4"
3 1/2"
3/4

JOB: Lay Out Small Curves and Arcs

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece, White Pine, #2, 1 X 10 X 1'6"
Sandpaper

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-21

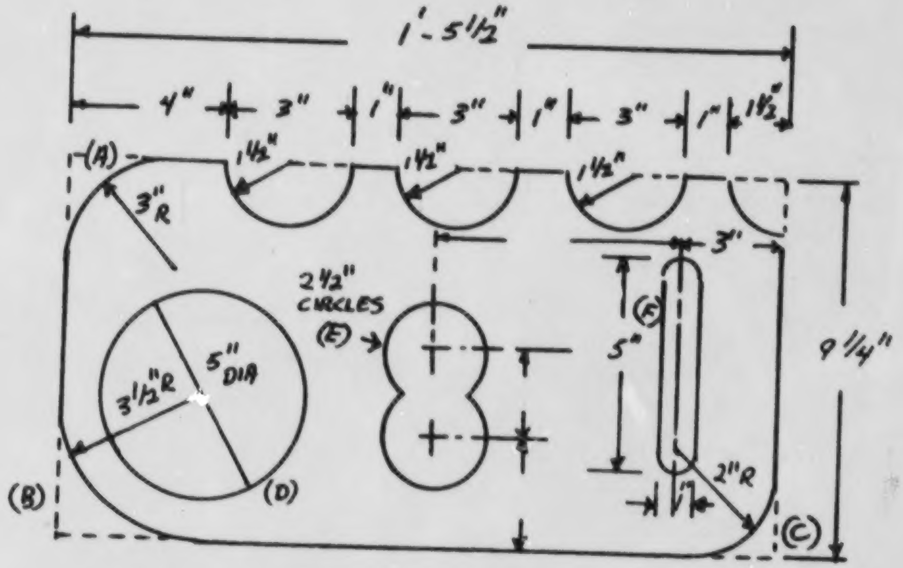
DRAWING NO: D-2-21

TOOLS:
Compass
Rule
Pencil
Combination Square
Try Square
10 Point Crosscut Saw
Jack Plane
Block Plane
Framing Square

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Sand both sides of the stock.	
2. Square up the material to the dimensions shown.	
3. Lay out the semi-circles to give the scalloped look.	. SC-2-18
4. Lay out the rounded corners at A, B and C.	. SC-2-18
5. Lay out the large circle. (D)	. SC-2-18
6. Lay out the overlapping circles in the center (E).	. SC-2-18
7. Lay out the handle at F.	NOTE: Have your work checked. NOTE: Keep the material for J-2-22.

METHOD OF EVALUATION:

1. Accuracy of layout
2. Procedures
3. Use and care of tools


1'-5 1/2"
4"
3"
1"
3"
1"
3"
1"
1 1/2"
(A)
1 1/2"
1 1/2"
1 1/2"
3"R
3"
2 1/2" CIRCLES
(E)
(F)
5"
9 1/4"
5" DIA
3 1/2"R
(B)
(D)
1"
2"R
(C)

LAY OUT SMALL CURVES AND ARCS

DRAWING NUMBER

D-2-21

JOB: Cut Curves and Arcs With a Compass Saw

JOB SHEET IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-22

COURSE: Carpentry

MATERIAL: 1 Piece 1 X 10 x 1'-6", #2 White Pine from J-2-21

EQUIPMENT: Bench Vise

TOOLS: Compass Saw

SAFETY PRECAUTIONS:

Use care while cutting with the compass saw which has sharp teeth and a sharp pointed end.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Clamp the stock in a vise.	See sketch at A, B, and C.
2. Cut the outside curves at A, B, and C with the compass saw.	. SC-2-19 NOTE: Small radius curves are cut with short strokes near the narrow pointed end of the saw blade. The larger curves are cut with the wide part of the blade and longer strokes.

METHOD OF EVALUATION:

1. Procedures used
2. Accuracy of cuts
3. Appearance

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-23

JOB: Cut Curves With a Coping Saw

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: From J-2-22

TOOLS: Coping Saw with Blade

EQUIPMENT: Bench Vise

SAFETY PRECAUTIONS:

Observe all safety rules for hand tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place the stock in a vise with the scallop-like edge up.	
2. Cut 3" diameter curves along scalloped edge with the coping saw.	. SC-2-20 NOTE: Make sure the saw blade is perpendicular to (at 90°) the surface of the stock so the edges will be square.

METHOD OF EVALUATION:

1. Procedures used
2. Accuracy of cuts
3. Appearance

JOB: Cut With a Sabre Saw

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Stock From J-2-23

EQUIPMENT: Sabre Saw and Blades

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-24

SAFETY PRECAUTIONS:

Observe all safety rules for portable power tools and extension cords.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: When sawing, always cut on the waste side and leave layout lines standing.
1. Cut out a 5" diameter circle with sabre saw. Start by plunge cutting.	. SC-2-21
2. Drill two overlaping 2 1/2" diameter circles as shown with a hand brace and expansive bit.	. SC-2-10
3. With brace and auger bit, bore a 1" diameter hole at each end of the handle as shown.	. SC-2-10 . SC-2-21
4. Cut along the straight lines between these circles with a sabre saw to complete the handle.	

METHOD OF EVALUATION:

1. Procedures used
2. Accuracy of cuts
3. Appearance

JOB: Shape and Smooth Curved Surfaces With a Wood Rasp or File

JOB SHEET IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-25

COURSE: Carpentry

MATERIAL: From J-2-24

TOOLS:
Wood Rasp
Wood File
Bench Vise

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Clamp stock in vise.	
2. Remove the high spots or rough spots with a wood rasp.	. SC-2-22
3. Smooth all curved edges with a wood file.	. SC-2-22
	NOTE: Have your work checked.

METHOD OF EVALUATION:

1. Procedures used
2. Accuracy of cuts
3. Appearance

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-26

JOB: Rip Stock on Table Saw

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece, Plywood, ext., G1S, 3/8" X 14" X 2'-8"
1 Piece, White Pine, #2, 1 X 10 X 5'-0"

EQUIPMENT: Table Saw

SAFETY PRECAUTION:

Before you begin this job, you must have been checked out on the table saw.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Rip the piece of pine 1/2" wider than the finish width of the bottoms and ends of the tool box shown in D-2-32.	. SC-2-23
2. Rip the piece of plywood into two pieces for the sides of the tool box.	NOTE: Have your work checked. NOTE: Save the material for J-2-27.

METHOD OF EVALUATION:

1. Setup and operation technique
2. accuracy of cut
3. safety practices

JOB: Joint The Edge of Stock

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-27

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: From J-2-26
1 Piece, Oak, 1 X 3 X 4'-0"

EQUIPMENT: Jointer
Table Saw

SAFETY PRECAUTION:

Before you begin this job, you must have been checked out on the jointer.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Straighten one edge of each piece of stock on the jointer.	. SC-2-24
2. Mark the jointed edges with X's.	
3. Rip the stock 1/16" wider than the finished width shown in D-2-32.	. SC-2-23
4. Joint to the finished width.	. SC-2-24
	NOTE: Have your work checked.

METHOD OF EVALUATION:

1. Setup and operation technique
2. Accuracy of cut
3. Safety procedures

JOB: Cut To Length With a Radial Arm Saw

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: Use Material From J-2-27

TOOLS: Rule

EQUIPMENT: Radial Saw

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-28

SAFETY PRECAUTION:

Before you begin this job, you must have been checked out on the radial saw.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Square one end of each piece of stock.	. SC-2-25
2. Lay out the length of the bottom.	. D-2-32
3. Cut the bottom to length.	. SC-2-25
4. Lay out and cut the sides to length.	. SC-2-25
5. Cut the remaining piece of pine into two pieces for the ends of the tool box.	. SC-2-25 NOTE: Have your work checked. NOTE: Keep the material for the next job.

METHOD OF EVALUATION:

1. Setup and operation
2. Accuracy of work
3. Safety procedures

JOB: Enlarge or Transfer an Irregular Design

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece, Index Paper, 10" X 16"

TOOLS:
- Pencil
- Rule
- Triangular Scale
- Combination Square
- T-square
- Draftsman's Triangle

JOB SHEET IDENTIFICATION CODE

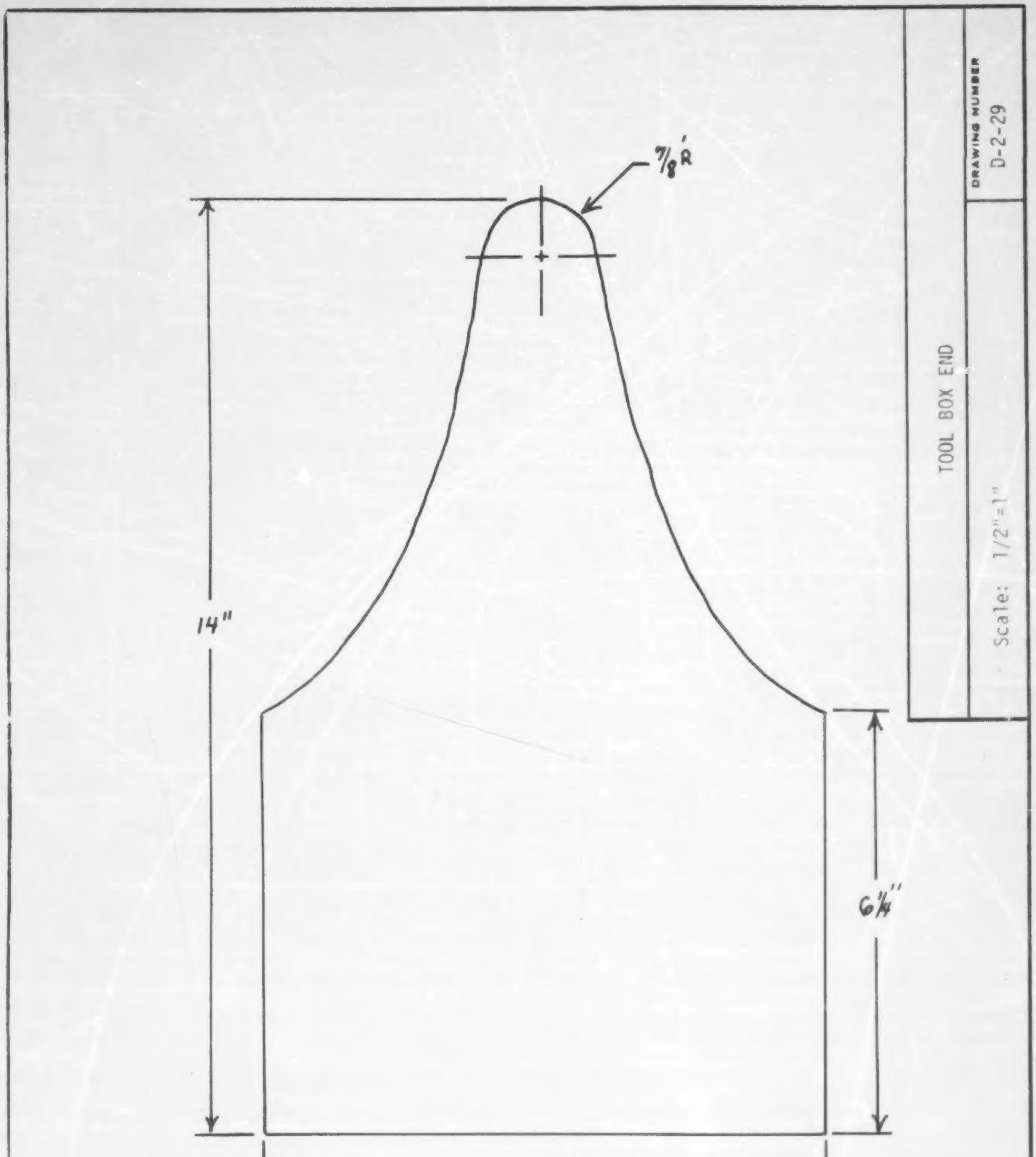
JOB NUMBER: J-2-29

DRAWING NO: D-2-29

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Refer to SC-2-26.
1. Draw horizontal and vertical grid lines to represent 1" spaces on D-2-29.	NOTE: The grid lines must be drawn in the same scale used in the drawing.
2. Draw horizontal and vertical grid lines at 1" intervals on the index paper.	. SC-2-26
3. Mark the points on the drawing where the grid lines cross the object lines.	
4. Transfer the dots (crossing points) from the drawing to the pattern.	
5. Connect the dots to duplicate the original drawing.	NOTE: Have your work checked. NOTE: Save the pattern for J-2-32.

METHOD OF EVALUATION:

1. Check accuracy of layout
2. Check similarity to original drawing
3. Check for smooth, even curves


DRAWING NUMBER
D-2-29
TOOL BOX END
Scale: 1/2"=1"
7/8 R
14"
6¼"
8½"

JOB: Assemble Butt Joints by Nailing

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece, 1 X 4 X 2'

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-30

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut stock in two to make 2 pieces 1" X 4" X approximately 12".	
2. Select the proper size nails and a suitable hammer.	
3. Determine and mark where the nails are to be located (to assemble as in Fig. A).	. SC-2-27
4. Lay piece #1 on a flat surface and drive the nails until the points begin to show on the back.	NOTE: When nailing into end grain, drive the nails at slight angles to each other. This results in greater holding power.
5. Place the two pieces in position and drive the nails to full depth.	
6. Disassemble and nail together again as shown in the other drawings.	NOTE: Drilling holes slightly smaller than the diameter of the nail will prevent splitting when nailing near the end of a board.

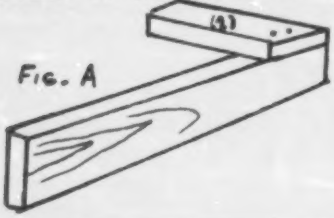


Fig. A

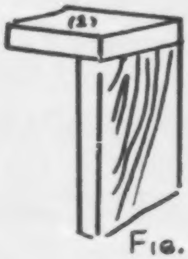


Fig. B

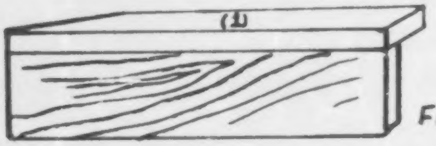


Fig. C

METHOD OF EVALUATION:

1. Layout
2. Selection of nails
3. Fastening technique

JOB: Assemble Butt Joints By Nailing

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 2 Pieces, 2 X 4 X 1'6"
10d Common Nails

TOOLS: Hammer
3/16" Drill Bit and Hand Drill

SAFETY PRECAUTIONS:

Be careful not to pound fingers.

JOB SHEET
IDENTIFICATION CODE

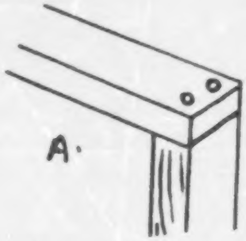
JOB NUMBER: J-2-31

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Locate and drive 10d nails through the first piece until points begin to show through. (sketch A)
2. Place the top piece in exact alignment on lower piece and drive the nails home.
3. Pry the pieces apart and save the nails and stock for the next job.
4. Locate and drive the nails through the first piece as shown at (B).
5. Align pieces with the edge, flush with face, and drive the nails home.
6. Pry pieces apart and remove nails. Save nails and material for final job.
7. Locate and drive nails through first piece.
8. Align pieces with all edges flush and drive nails home.

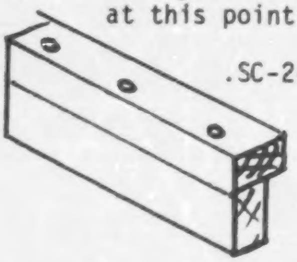
TEACHING/LEARNING ACTIVITIES

. SC-2-27

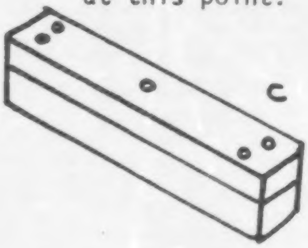


NOTE: Have your work checked at this point.

.SC-2-27A



NOTE: Have your work checked at this point.



NOTE: Have work checked.

METHOD OF EVALUATION:

Work will be checked for alignment of pieces, spacing of nails and absence of hammer marks.

JOB: Make a Tool Box

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-32

DRAWING NO: D-2-32

MATERIAL:
4 Woodscrews, Flat Head, 2" X #10
3 Woodscrews, Flat Head, 1 1/4" X #6
1 Woodscrew, Flat Head, 7/8" X #6
1 Stove Bolt, Flat Head, 1/4" X 3 1/2"
8d Box Nails
4d Box Nails
Abrasive Papers
1 Piece Oak, 1 x 3 x 6"

EQUIPMENT:
Radial Saw
Jointer
Circular Saw
Sabre Saw
Belt Sander
Electric Saw
Bar Clamps
C-Clamps

TOOLS:
Rasp
Backsaw
Screwdriver
Square
Compass
Claw Hammer
Ripsaw
Rule
Block Plane
Adjustable Wrench
Hand Screws
Wood Chisels

SAFETY PRECAUTIONS:

Observe safety while using hand tools and power tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Work the 1 X 8 to width for the bottom and ends. Cut pieces to length. Material from J-2-28.	
2. Make a full scaled pattern for the ends. (from J-2-29).	
3. Lay out and cut the curves on the ends with a sabre saw.	. SC-2-21
4. Smooth the curves with a wood rasp, then sand.	. SC-2-22
5. Sand all surfaces of bottom and ends.	
6. Nail the ends to the bottom with 8d box nails.	. SC-2-27
7. Square up the plywood pieces for the sides and nail in place with 4d box nails. (from J-2-28)	
8. Square up the piece for the handle and tool rack. Work as one piece, then cut to length. (from J-2-28)	

COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

9. Chamfer the edges of the handle with a block plane.

10. Fasten the handle in place with two 2" x #10 woodscrews in each end.

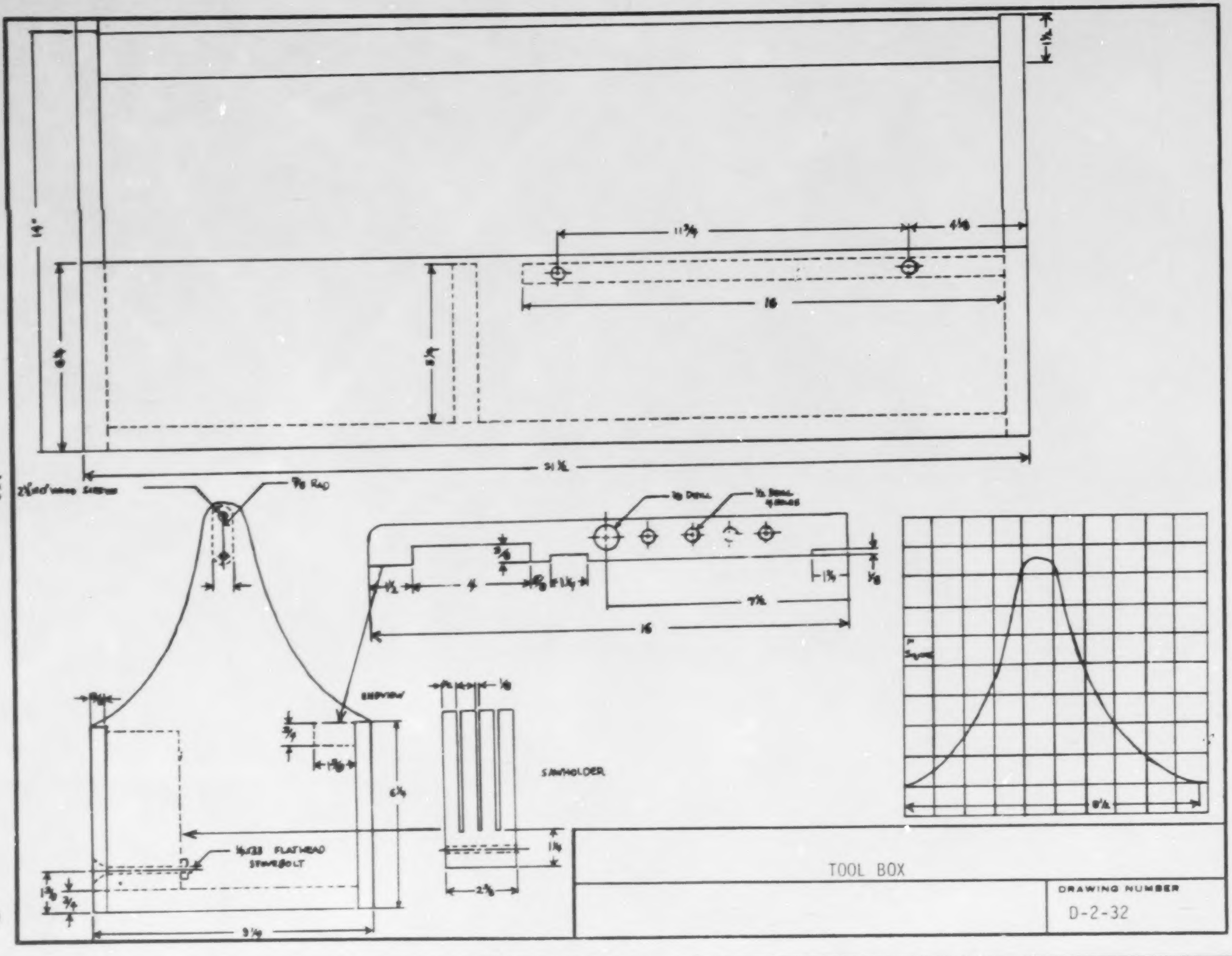
11. Work the tool rack to size and shape, make cutouts and drill holes for tools; then fasten in place with three 1 1/4" X #6 woodscrews.

12. Work the piece for the saw rack to size by hand. Make the saw kerfs to hold the saw; then fasten in place. Install a 1/4" X 3 1/2" stove bolt through the piece on the bottom.

13. Sand inside and out.

METHOD OF EVALUATION:

1. Safety
2. Procedures
3. Accuracy
4. Neatness
5. Time
6. Use and care of tools


14"
6¾
31½
11¾
4⅛
16
8½
2⅜ x 10 WOOD SCREWS
⅝ RAD
½ DRILL
½ DRILL
½
4
1¼
7½
16
1⅛
1" SQUARE
8½
END VIEW
¾
1⅜
6¾
SAWHOLDER
¼ x 33 FLATHEAD
STOVEBOLT
1⅜
¾
9¼
1¼
2⅜

TOOL BOX

DRAWING NUMBER

D-2-32

JOB: Whet Cutting Edge of Wood Chisel

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-33

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

EQUIPMENT: Tool Grinder

TOOLS: 3/4" Wood Chisel

SAFETY PRECAUTIONS:

Be careful of sharp edges.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare the coarse side of the sharpening stone. Place it in the holder and clamp the holder in the bench vise.	. SC-2-28
2. Set the wood chisel at the proper whetting angle and hone the edge.	NOTE: A further keen edge is obtained by drawing the chisel across a piece of leather repeatedly on the bevel side and then on the back. This will remove any remaining wire edge.
3. Remove the wire edge on the flat side of the chisel.	
4. Repeat steps 2 and 3 until the edge is sharp.	
5. Repeat steps 1 through 4 using the fine side of the sharpening stone.	

METHOD OF EVALUATION:

1. Job will be checked for sharp, keen, invisible edges.
2. Safe procedures

JOB: Sharpen a Plane Iron and Wood Chisel

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-34

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

EQUIPMENT: Bench or Pedestal Grinder
Combination Oilstone

TOOLS: Plane Iron
Wood Chisel

SAFETY PRECAUTIONS:

1. Before beginning this job you must have been checked out on the grinder.
2. Make sure guards and face shields are in place.
3. Adjust tool rest.
4. Wear face shield when grinding.

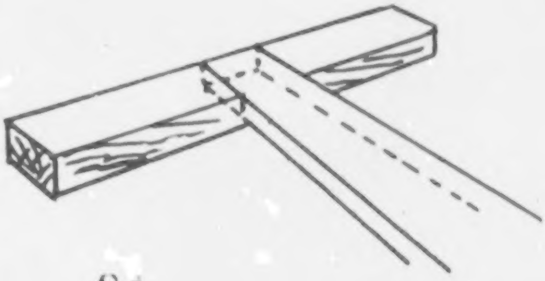
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
Plane Iron	
1. Remove and inspect plane iron.	. SC-2-4
2. Adjust the tool rest.	
3. Dress the cutting edge (if necessary).	. SC-2-29
4. Adjust the tool rest and grind the cutting edge to a 30° bevel.	. SC-2-29
5. Whet the cutting edge.	. SC-2-28
	NOTE: Have your work checked.
Wood Chisel	
1. Inspect the cutting edge.	
2. Dress the cutting edge (if necessary).	. SC-2-29
3. Grind the cutting edge to a 30° bevel.	. SC-2-29
4. Whet the cutting edge.	. SC-2-28
	NOTE: Have your work checked.

METHOD OF EVALUATION:

1. Sharpening technique
2. Cutting Edge
   a. Angle
   b. Square
   c. Sharp

JOB:	Make the Notch (or Gain Joint)	JOB SHEET IDENTIFICATION CODE
UNIT II:	Hand and Machine Tool Processes	JOB NUMBER: J-2-35
COURSE:	Carpentry	
TOOLS:	Backsaw 1" Wood Chisel Combination Square Try Square Marking Gage Rule Pencil	
MATERIAL:	1 Piece, 2 X 4 X 1'-6" 1 Piece, 1 X 4 X 1'-0"	

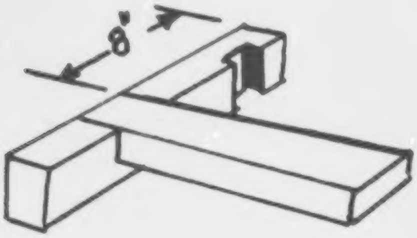
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Square a line across the face of the 2 X 4 two inches from the end.	NOTE: If the joint is made properly, the two pieces should fit together tightly, but neither should be marked when you are putting them together.
2. Put the 1 X 4 in position with one edge even with the line marked in Step 1. Mark along the other edge of the 1 X 4.	
3. Extend the lines from Steps 1 and 2 across the edges of the 2 X 4.	
4. Set the marking gage to the thickness of the 1 X 4.	. SC-2-2
5. Gage depth lines on the edges of the 2 X 4 with the marking gage.	. SC-2-2
6. Cut the sides of the notch with the backsaw.	. SC-2-3
7. Make saw kerfs between the side cuts to make removing the wood easier.	
8. Cut the notch to the proper depth with the 1" chisel.	. SC-2-30
9. Test for fit.	



COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

NOTE: Have the instructor check your work.

10. Follow the same procedure to cut the notch in the edge of the 2 X 4 in Figure 2.



METHOD OF EVALUATION:

1. Joint should be tight with no crushing in evidence
2. Width and depth of notch

JOB: Lay Out Angles With a Framing Square

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

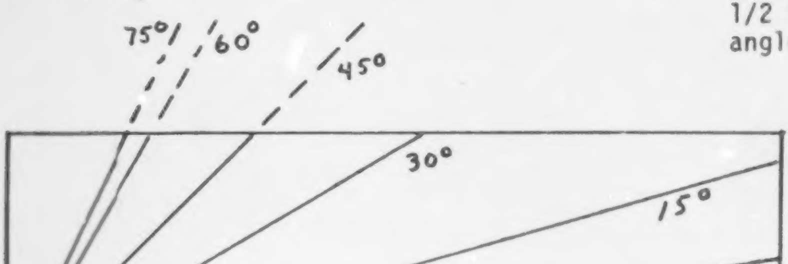
MATERIAL: 1 Piece, White Pine, #2, 3/4" X 3 1/2" X 16"

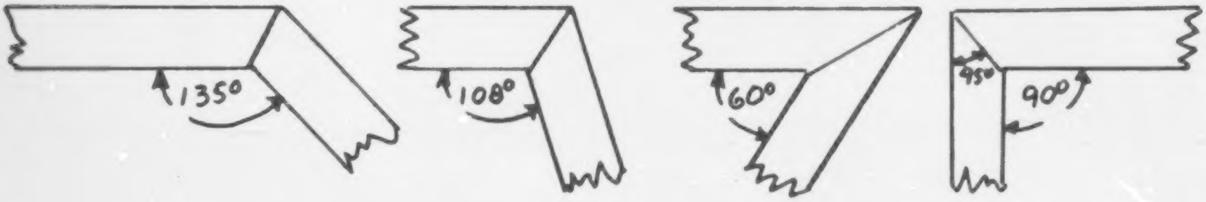
TOOLS: Framing Square

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-36

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Use the framing square and information from the angle table to lay out the angles shown in Fig 1.	. SC-2-31
2. On the other side of the board, lay out the miter angles for the joints shown on Fig. 2.	. SC-2-31 NOTE: Miter angles are cut 1/2 the size of the finished angle.





ANGLE TABLE FOR THE SQUARE

Degrees	Blade Meas.	Degrees	Blade Meas.	Degrees	Blade Meas.	Degrees	Blade Meas.
1	3/16	20	4 3/8	37	9	52	15 3/8
2	7/16	20 1/2	4 1/2	38	9 3/8	52 1/4	15 1/2
2 1/2	1/2	21	4 5/8	38 1/2	9 9/16	53	15 15/16
3	5/8	22	4 7/8	39	9 11/16	53 1/4	16
4	13/16	22 1/2	5	40	10	54	16 1/2
4 1/2	1	23	5 1/16	41	10 7/16	54 3/4	17
5	1 1/16	24	5 5/16	41 1/4	10 1/2	55	17 1/8
6	1 1/4	24 1/2	5 1/2	42	10 13/16	55 1/2	17 1/2
7	1 1/2	25	5 9/16	42 1/2	11	56	17 13/16
8	1 11/16	26	5 7/8	43	11 3/16	56 1/4	18
9	1 7/8	26 1/2	6	43 3/4	11 1/2	57	18 1/2
9 1/2	2	27	6 1/8	44	11 9/16	57 3/4	19
10	2 1/8	28	6 3/8	45	12	58	19 3/16
11	2 5/16	28 1/4	6 1/2	46	12 7/16	58 1/2	19 1/2
11 3/4	2 1/2	29	6 5/8	46 1/4	12 1/2	59	20
12	2 9/16	30	6 15/16	47	12 7/8	59 3/4	20 1/2
13	2 3/4	30 1/4	7	47 1/4	13	60	20 13/16
14	3	31	7 3/16	48	13 5/16	60 1/4	21
15	3 5/16	32	7 1/2	48 1/2	13 1/2	61	21 1/2
16	3 7/16	33	7 13/16	49	13 13/16	61 1/2	22
16 1/4	3 1/2	33 3/4	8	49 1/2	14	62	22 1/2
17	3 11/16	34	8 1/8	50	14 5/16	62 1/2	23
18	3 7/8	35	8 3/8	50 1/2	14 1/2	63	23 1/2
18 1/2	4	35 1/4	8 1/2	51	14 13/16	63 1/2	24
19	4 1/8	36	8 11/16	51 1/2	15		

NOTE: Use 12" on tongue of square and figure found in angle for desired angle on blade of square. MARK ALONG BLADE.

METHOD OF EVALUATION:

1. Use of square
2. Accuracy of layout

JOB: Lay Out Braces With a Framing Square

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 6 X 2'-6"
1 Piece, Plywood, 1/2" x 1'-4" X 2'-6"

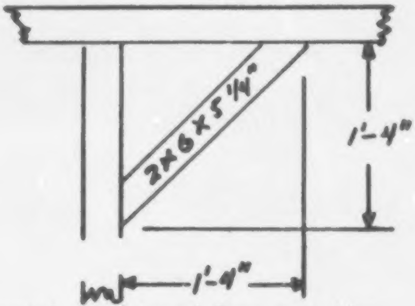
TOOLS: Framing Square

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-37

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Use the framing square to lay out the brace shown in Fig. 1.	. SC-2-31

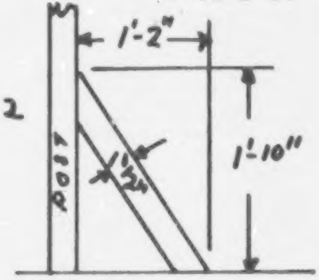
FIG-1



NOTE: Have your work checked.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
2. Remove the layout marks and lay out the brace shown in Fig. 2.	. SC-2-31

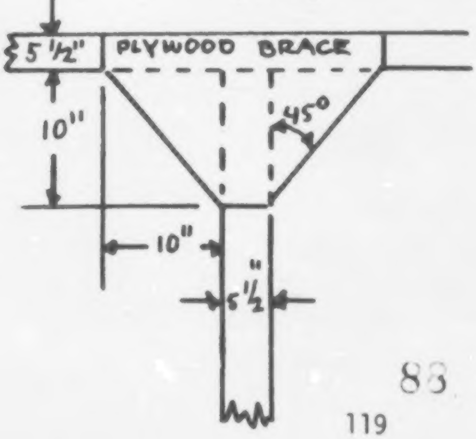
FIG.2



NOTE: Have your work checked.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
3. Lay out the plywood brace shown in Fig. 3.	. SC-2-31

FIG-3



NOTE: Have your work checked.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

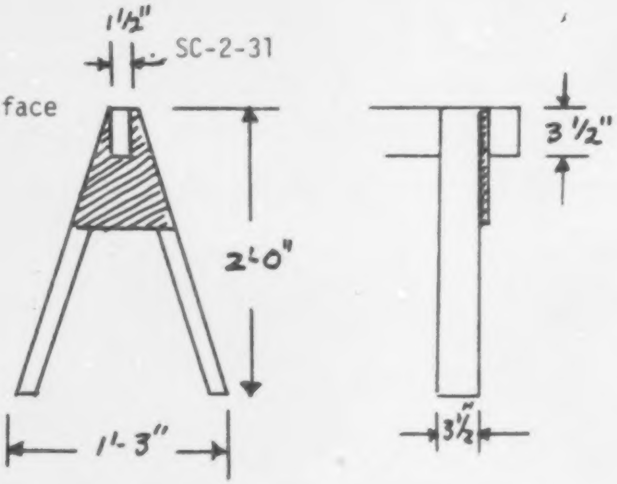
Check accuracy of layout.

JOB:	Lay Out Saw Horse or Trestle Legs	JOB SHEET IDENTIFICATION CODE
UNIT II:	Hand and Machine Tool Processes	JOB NUMBER: J-2-38
COURSE:	Carpentry	
MATERIAL:	1 Piece, 2 X 4 X 2'-4"	
TOOLS:	Rule Pencil Framing Square	

SAFETY PRECAUTIONS:

Observe general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine the rise and run of the leg.	
2. Lay the 2 X 4 on its edge.	
3. Lay out for the top cut near one end.	. SC-2-31
4. Lay out the length of the leg with the framing square.	
5. Lay out for the bottom cuts.	SC-2-31
6. Square the lay out marks across the face of the 2 X 4.	



METHOD OF EVALUATION:

1. Check angles
2. Check dimensions

JOB: Lay Out Saw Horse or Trestle Legs

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

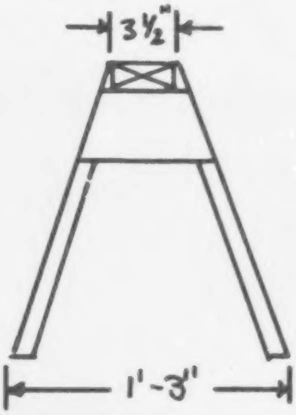
MATERIAL: 1 Piece, 1 X 4 X 2'-0"

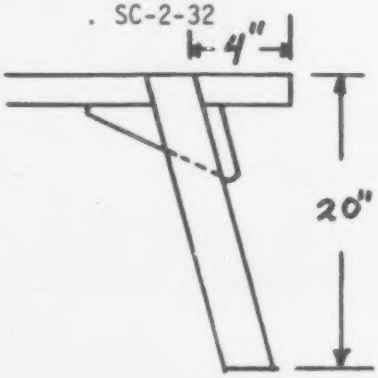
TOOLS:
Rule
Pencil
T-Bevel
Framing Square

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-39

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine the total diagonal run of the leg.	. SC-2-32
2. Determine the numbers to be used on the framing square to lay out the angles on the face and edge of the leg.	. SC-2-32
3. Lay out angles for the top cut near one end of the stock.	. SC-2-32
4. Lay out the length of the leg with a framing square. Use the total diagonal run and the total rise to find the length.	. SC-2-32





METHOD OF EVALUATION:

1. Check angles
2. Check length

JOB: Cut Compound Angles

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: From J-2-30

EQUIPMENT: Bench Vise

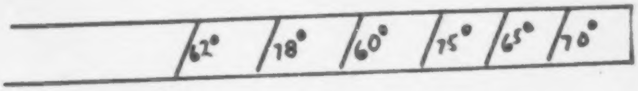
TOOLS: Hand Crosscut Saw
Framing Square
T-Bevel

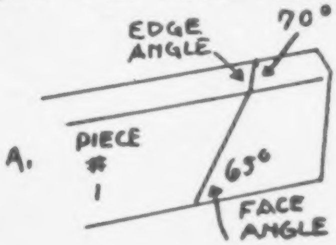
JOB SHEET IDENTIFICATION CODE

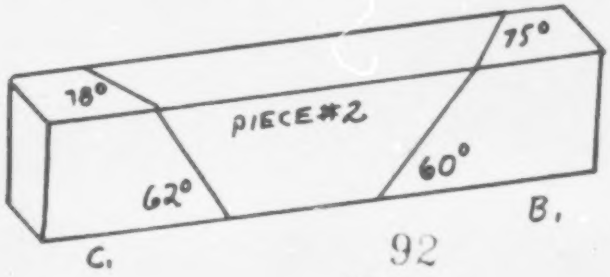
JOB NUMBER: J-2-40

SAFETY PRECAUTIONS:

Use care with hand tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Since the stock is short, angles will be laid out on scrap material that is long enough, then transferred with a T-bevel. (SC-2-7)
1. Find figures to use on framing square from angle table. Lay out the following angles on a piece of straight stock about 1 X 4 X 3'.	. SC-2-33
2. Use the T-bevel and transfer these angles to the stock as shown in sketches A, B, and C.	
3. Make compound cuts with the hand saw. Layout lines should remain.	. SC-2-33
	NOTE: A compound cut is made on each end of piece #2 as noted in sketch.





COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

1. Accuracy of the angles
2. Neatness of the cut

JOB: Build a Saw Horse

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-2-41

DRAWING NO: D-2-41

MATERIAL:
1 Piece, 2 X 4 X 3'6", White Fir
1 Piece, 1 X 4 X 2'2", #2 White Pine
1 Piece, 2 X 6 X 1'0", White Fir
1 Piece 1/2" X 8 X 1'4", Plywood
Nails (8d, 10d 16d)

EQUIPMENT:
Radial Saw
Circular Saw
Jointer

TOOLS:
Framing Square
T-Bevel
Wood Chisel
Claw Hammer
Crosscut Saw

SAFETY PRECAUTIONS:

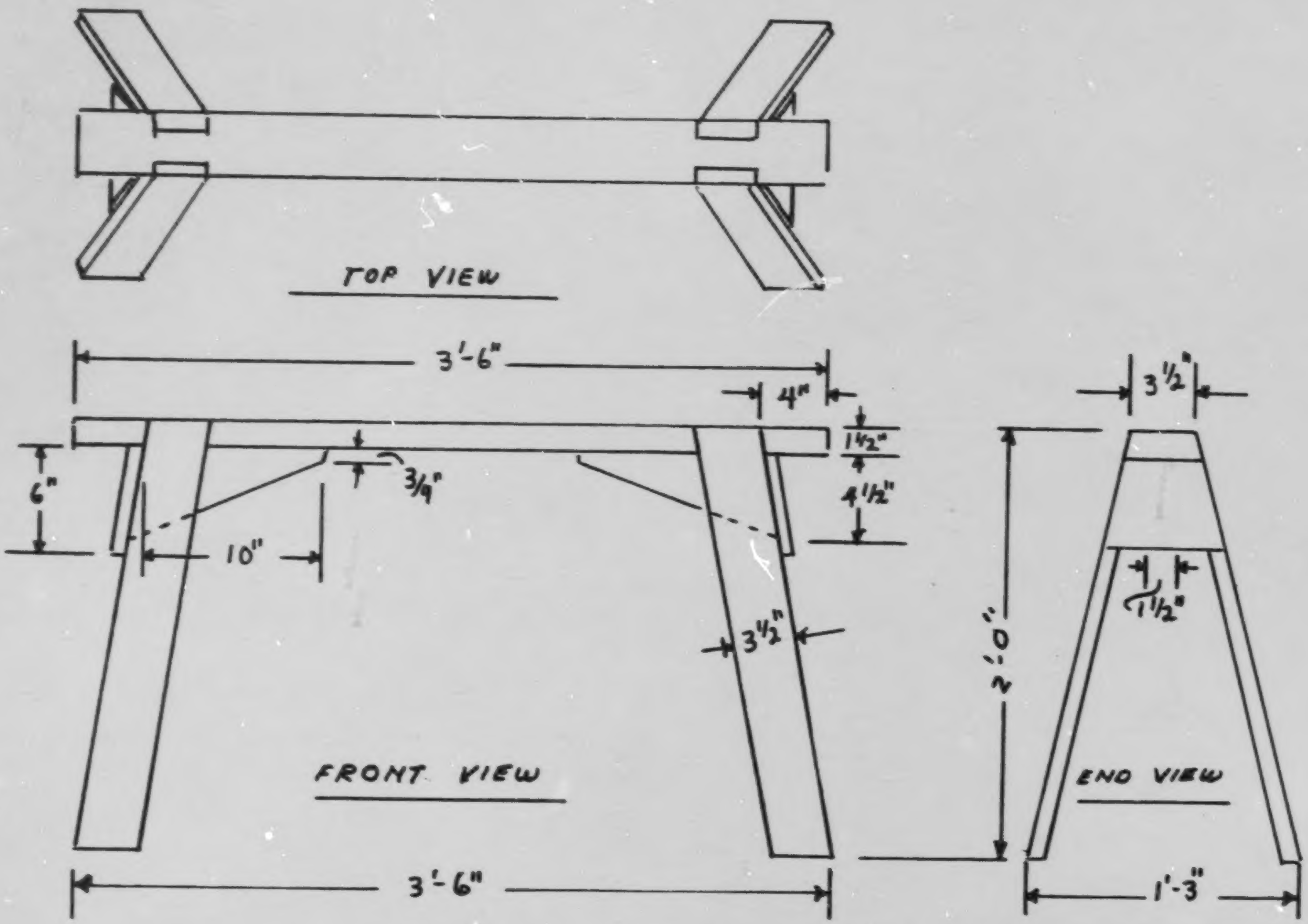
1. Observe all stop safety rules.
2. Observe safety while using hand tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut the top beam to length.	NOTE: Check all dimensions carefully to avoid waste.
2. Work the legs to width.	
3. Lay out and cut the legs to length.	
4. Lay out and cut notches in the beam for the legs.	
5. Nail the legs in place. (3-8d box nails on each leg)	
6. Lay out and cut the end braces (for across the ends of the legs).	
7. Nail the end braces in place (3 - 6d box nails into each leg).	
8. Layout and cut the bottom braces.	
9. Nail the bottom braces in place (1 - 8d box, 1 - 10d box and 1 - 16d common through each brace). Then put 2 - 8d box nails through the end brace into the bottom brace.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
10. Sand all surfaces.	

METHOD OF EVALUATION:

1. Safety
2. Procedures
3. Accuracy
    a. overall dimensions
    b. quality of joints
    c. size and installation of joints
4. Nailing
5. Overall appearance and stability


TOP VIEW
3'-6"
4"
1½"
6"
3/4"
4½"
10"
3½"
FRONT VIEW
3'-6"
3½"
2'-0"
1½"
END VIEW
1'-3"

SAW HORSE

DRAWING NUMBER

D-2-41

JOB: Cut Dadoes and Rabbets With a Radial Arm Saw

JOB SHEET IDENTIFICATION CODE

UNIT II: Hand and Machine Tool Processes

JOB NUMBER: J-2-42

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 4 X 2'-0"
1 Piece, 1 X 4 X 2'-0"

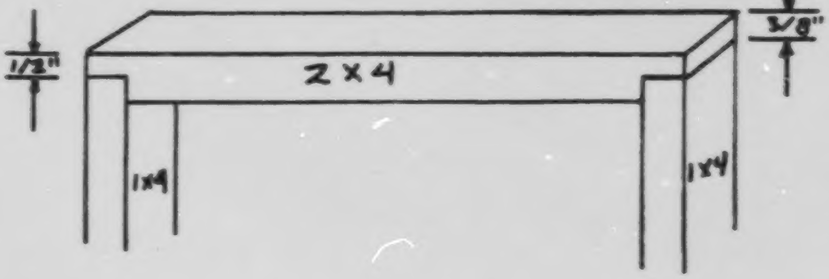
TOOLS: Dado Set

EQUIPMENT: Radial Arm Saw

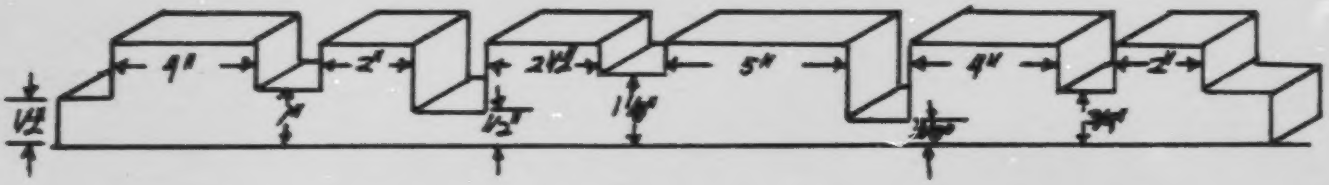
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Install a combination blade on the radial saw.
2. Rabbet the end of the 2 X 4 as shown. The width of the rabbet should be equal to the thickness of the 1 X 4 stock.

NOTE: Have the instructor check your work.



3. Remove the combination blade and install the dado set.
4. Cut the dadoes shown below in the 2 X 4. The width of the dadoes will be equal to the thickness of the 1 X 4.



METHOD OF EVALUATION:

1. Proper procedure
2. Accuracy of spacing and cuts

JOB: Shape Edges With a Router

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

MATERIAL: From J-2-25

EQUIPMENT: Router
1/4" Beading Bit with Center Pin
3/8" Rounding Over Bit with Center Pilot
Chamfering Bit with Center Pilot

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-43

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Shape all outside edges with the 1/4" beading bit, (one side only) as in Fig. 1.	. SC-2-35
2. Shape handle with 3/8" rounding over bit. Fig. 2.	. SC-2-35
3. Shape the edges of all circles with chamfering bit, (both sides of stock) as in Fig. 3.	. SC-2-35

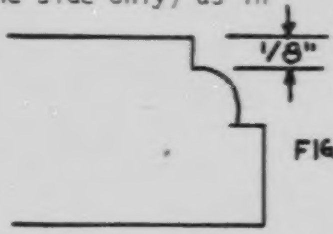


FIG-1

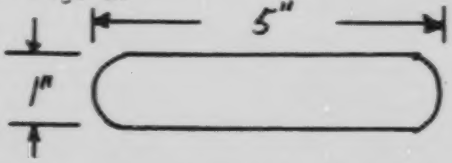


FIG-2

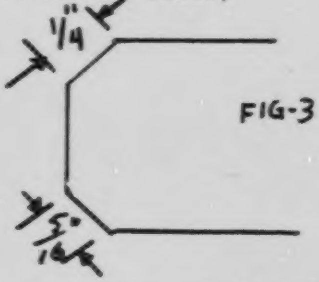


FIG-3

METHOD OF EVALUATION:

1. Procedures
2. Appearance
3. Safety

JOB:	Cut Grooves, Dadoes, and Rabbets With a Router	JOB SHEET IDENTIFICATION CODE
UNIT II:	Hand and Machine Tool Processes	JOB NUMBER: J-2-44
COURSE:	Carpentry	
MATERIAL:	(1) Piece, White Pine, #2, 3/4" X 12" X 12"	
EQUIPMENT:	Rotable Router--Porter-Cable 1/2" Straight Cutting Bit 1/4" Straight Cutting Bit V-Grooving Bit	

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
Be creative, make own design. The following cuts must be included:	
1. Make two dado cuts (1/4" deep X 5/8" wide) using a straightedge as a guide.	. SC-2-36
2. Make two 3/4" wide, 3/8" deep dado cuts with the edge guide.	
3. Make two V-grooves parallel to the grain with a straightedge as a guide.	
4. Plow two grooves (1/4" X 1/4") using the edge guide.	

METHOD OF EVALUATION:

1. Procedures
2. Appearance
3. Safety

JOB: Make a Nail Tray

UNIT II: Hand and Machine Tool Processes

COURSE: Carpentry

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-2-45

DRAWING NO: D-2-45

MATERIAL:
1 Piece, White Pine, #2, 1/2" X 4" X 7'0"
1 Piece, White Pine, #2, 5/8" X 6" X 1'6"
1 Piece, Plywood, 1/4" X 12" X 1'4"
Abrasive Papers
Elmer's Glue
4d Finish Nails

TOOLS:
Electric Drill
Wood Chisels (1" and 5/8")
Rasp

EQUIPMENT:
Pencil
Rule
Combination Square
Sanding Block
Bar Clamps
Router
Jointer
Circular Saw
Radial Saw
Belt Sander
1" Spade Bit

COMPETENCE- PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut the 7'-0" piece into the following pieces: 1--2'-10" (2 sides) 1--2'-2" (2 sides) 1--2'-0" (2 dividers)	. SC-2-5
2. Joint one edge of all pieces including the center partition and bottom.	
3. Rip all pieces 1/16" wider than finish width.	
4. Joint all pieces to finish width.	
5. Sand all flat surfaces with a belt sander.	
6. Sand all edges with a sanding block.	
7. Cut sides and ends to finish length.	
8. Lay out and cut dadoes and rabbets in sides and ends with radial saw.	

9. Plow grooves for the bottom with the router.

10. Assemble the outside frame temporarily and measure the length of the center partition and bottom.

11. Cut the partition to length.

12. Cut the bottom to size. Allow 1/16" clearance in each direction.

13. Lay out and cut stop dadoes. Square up dadoes with a wood chisel.

14. Put the center partition in place and tack it temporarily.

15. Mark the top edge of the frame at both ends of the center partition.

16. Measure the length of the center dividers and cut them to length.

17. Lay out and cut the center partition to shape.

18. Lay out and cut out the hand hole. Drill 1" holes at the ends. Finish the cut with the sabre saw. Smooth the edge with a wood rasp then round the edge with the rounding over bit and router.

19. Assemble the nail tray as follows:

    A. Glue and nail one end and two sides together.

    B. Put in the bottom.

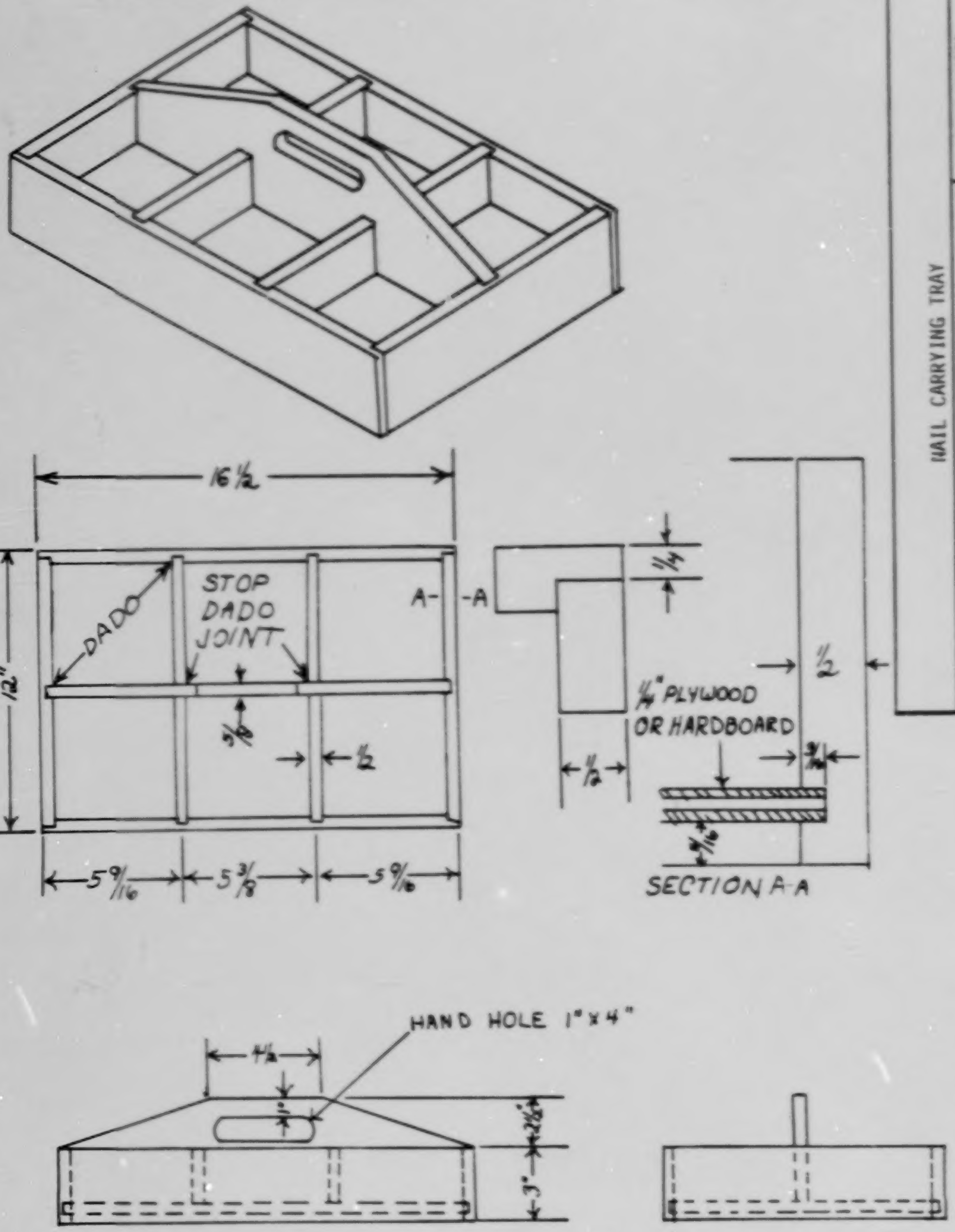
    C. Glue and fasten the other end.

    D. Apply glue, then position the dividers in the dadoes in the sides.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
E. Apply glue to dadoes in end and center partitions. Then install the center partition.	
F. Nail through the sides into the dividers and through the ends into the center partition.	
G. Screw the bottom to the center partition with three 1" X 6" flat head wood screws.	
20. Sand completed job with finishing sander.	

METHOD OF EVALUATION:

Submit work for checking and grade.


16 1/2
12"
DADO
STOP
DADO
JOINT
3/8
1/2
5 9/16
5 3/8
5 9/16
A-
-A
1/4
1/2
1/2
1/4" PLYWOOD
OR HARDBOARD
9/16
9/16
SECTION A-A
HAND HOLE 1" x 4"
4 1/2
1"
2 1/2"
3"

NAIL CARRYING TRAY

DRAWING NUMBER
D-2-45

Scale: 1/2"=1"

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-3-1

JOB: Prepare Layout Stakes

UNIT III: Building Layout

COURSE: Carpentry

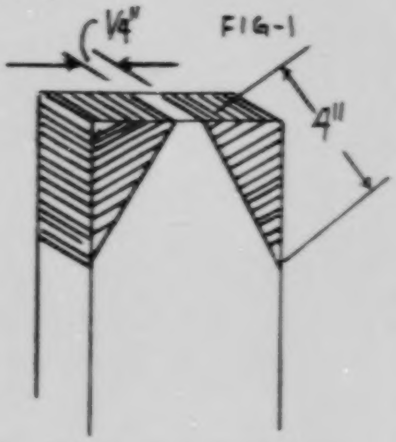
MATERIAL: 1 Pc 2 X 4 X 4'-0"
2 Pcs 2 X 4 X 12'-0"

EQUIPMENT: Radial Arm Saw

TOOLS:		
	Hatchet	Rule
	Hammer	T-Bevel

SAFETY PRECAUTIONS:

1. Observe all power tool and hand tool safety rules.
2. Use a chopping block when pointing stakes with a hatchet.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Rip the 2 X 4 X 4' into 2 X 2's on the radial arm saw	. SC-3-1
2. Cut the 2 X 2's into pieces 2' long.	. SC-2-25
3. Sharpen 2 X 2's with hatchet	. SC-3-2
4. Cut both the 2 X 4 X 12' pieces into pieces 3'-0" long.	FIG-1 
5. Lay out cutting lines on the face of one of the 2 X 4's as shown.	
6. Lay the 2 X 4 on the table of the radial saw so that one of the cutting lines will be in line with the path of the saw blade. The first cut should be made ½" beyond the layout line on the waste side of the stock.	
7. Mark the position of the 2 X 4 on the table.	
8. Nail a stop along the edge of the 2 X 4 to act as a guide when making the cuts.	CAUTION: The fence must be in good condition. The cut where the saw blade comes through the fence should be no wider than the thickness of the blade.
9. Position the end of the 2 X 4 against the fence and make the first cut.	

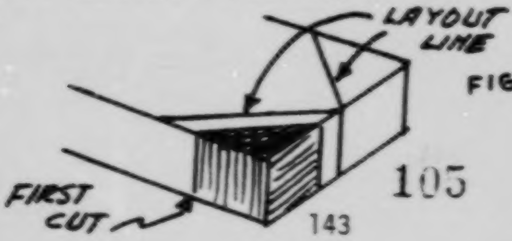
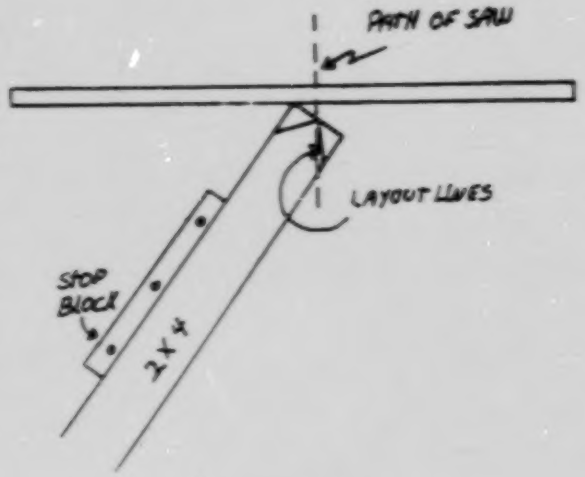


FIG-2

10. Flip the 2 X 4 over and with the end against the fence make the second cut.
11. Turn the 2 X 4 over one more time to complete the first cut to the layout line.
12. Sharpen all of the pieces of 2 X 4 in the same manner.

NOTE: Minor adjustments may need to be made to the stop block to ensure cutting to the lines.



METHOD OF EVALUATION:

Job will be checked for safe procedure and uniform points.

JOB: Drive Layout Stakes - Attach Dryline

JOB SHEET IDENTIFICATION CODE

UNIT III: Building Layout

JOB NUMBER: J-3-2

COURSE: Carpentry

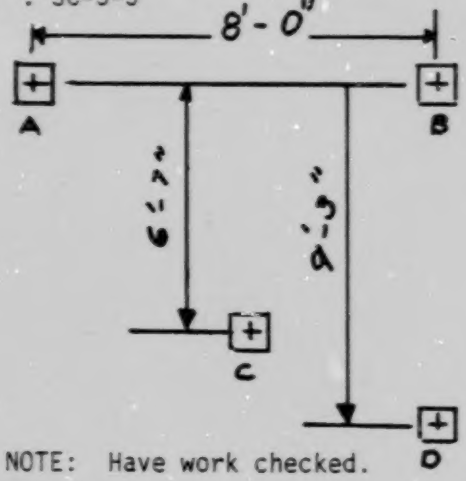
EQUIPMENT: 2" X 2" Stock From J-3-1

TOOLS:
Steel Tape
Sledge Hammer
Dryline

SAFETY PRECAUTIONS:

1. Use sledge hammer carefully.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Drive stake "A" as in sketch. Drive nail at center of stake.	. SC-3-3
2. Locate stake "B" 8'-0" from stake "A".	. SC-3-3, SC-3-4
3. Mark exact point on top of stake with nail.	
4. Attach a taut dryline to these nails.	. SC-3-5
5. Locate and drive stake "C". Accurately mark a distance of 6'-7" on top of stake.	
6. Repeat step 5 and drive stake "D". Mark exact distance of 9'-3" on top of stake.	



NOTE: Have work checked.

METHOD OF EVALUATION:

1. Check stakes for accuracy
2. Check taut lines

JOB: Square a Corner Using 3-4-5 Method

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-3-3

UNIT III: Building Layout

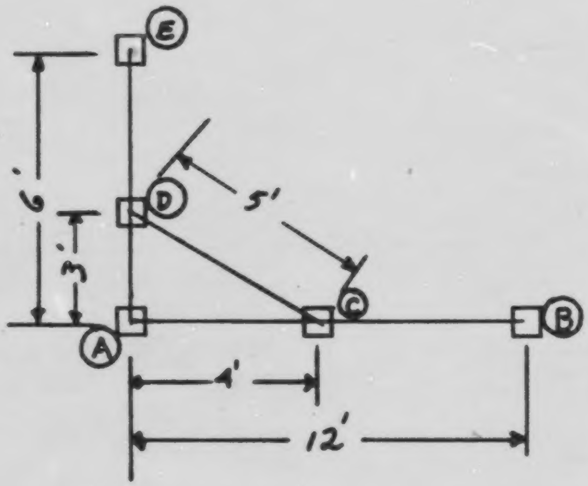
COURSE: Carpentry

MATERIAL: 1 Pc 2 X 4 X 6'-0"

EQUIPMENT: Radial Arm Saw

TOOLS:
Sledge Hammer
Nail Hammer
100' Steel Tape
Dryline
Hatchet

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Rip the 2 X 4 into 2 X 2's.	. SC-3-1
2. Cut 2 X 2's into pieces 2'-0" long.	. SC-2-25
3. Point one end of all pieces for stakes.	. SC-3-2
4. Drive stakes at points A and B as indicated on drawing.	. SC-3-3
5. Locate the exact points by driving small nails into the tops of the stakes.	
6. Stretch and secure a dryline from one stake to the other.	. SC-3-5
7. Drive a stake at "C". Locate the exact point with a nail driven into the top of the stake.	NOTE: Point "C" should be exactly 4'-0" from point "A" and directly under the dryline.
8. Use the steel tape and a large nail or pointed object to scribe an arc on the ground having a radius or 3'-0" from point "A".	
9. Use the same procedure to scribe an arc having a radius of 5'-0" from point "C".	
10. Drive a stake at the point where the arcs intersect.	
11. Repeat steps 8 and 9 to establish a point on top of the stake (point "D").	



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
12. Stretch a line from "A" through "D" to locate a stake and a mark on top of the stake at "E".	

METHOD OF EVALUATION:

Check complete layout for accuracy of:
1. dimensions.
2. right angle layout.

JOB: Establish a Rectangle with Layout Stakes

JOB SHEET IDENTIFICATION CODE

UNIT III: Building Layout

JOB NUMBER: J-3-4

COURSE: Carpentry

MATERIAL: 6 Pcs 2 X 2 from J-3-3

TOOLS:

Sledge Hammer	Steel Tape	Hatchet
Nail Hammer	Crosscut Handsaw	Dryline

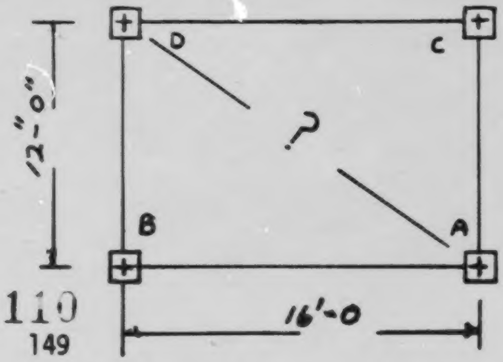
SAFETY PRECAUTIONS:

1. Observe all safety rules concerning use of hand tools and power tools.
2. Provide a chopping block when sharpening stakes with a hatchet.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Re-point stakes if necessary.	. SC-3-2 NOTE: Exact points to be located by driving a nail into top of stakes.
2. Establish line AB.	. SC-3-3, SC-3-4, SC-3-5
3. Use 3-4-5 method to establish line AC.	
4. Locate and drive stake at "D".	
5. Check accuracy of layout by measuring diagonals.	NOTE: If opposite sides are equal in length and parallel to each other and the right angle ABC is true, diagonals will be equal.

METHOD OF EVALUATION:

- Job will be checked for accurate dimensions and equal diagonals.



JOB: Locate and Stake Out Building on a Lot

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-3-5

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL: Stakes as Required
4D Finish Nails

TOOLS: Half Hatchet
Steel Tape
Dryline
16 oz. Claw Hammer
4 lb. Hand Hammer

SAFETY PRECAUTIONS:

1. Observe all safety rules while using the hatchet.
2. Keep hands away from cutting edge.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare stakes as needed.	. SC-3-1
2. Check plot plan for reference points.	. SC-3-2
3. Check property for existing hubs (4 corner stakes).	
4. Run tight lines across the front and down both sides of the lot.	. SC-3-5
5. Establish setback from front property line.	
6. Locate corner of building from front and side property line, and drive stake "A".	
7. Locate and drive stake "D".	. SC-3-3
8. Square corner A using the 3-4-5 method.	
9. Locate and drive stake "B".	
10. Locate and drive stake "C".	NOTE: Save the layout for J-3-11.

METHOD OF EVALUATION:

1. Interpretation of drawing
2. Layout procedure
3. Accuracy of layout

JOB: Set Up and Level a Level Transit

UNIT III: Building Layout

COURSE: Carpentry

EQUIPMENT: Builder's Level or Level-Transit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-3-6

SAFETY PRECAUTIONS:

Use care in handling the instrument and the tripod.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set up tripod.	. SC-3-6
2. Remove instrument from case.	
3. Install the instrument on the tripod.	. SC-3-6
4. Level the instrument.	NOTE: Have your work checked.
5. Set up and level the instrument directly over a point as assigned by the instructor.	. SC-3-6 NOTE: Have your work checked.

METHOD OF EVALUATION:

Instrument will be checked for accurate and proper setup.

JOB: Swing Horizontal Angles with Level-Transit

JOB SHEET IDENTIFICATION CODE

UNIT III: Building Layout

JOB NUMBER: J-3-7

COURSE: Carpentry

MATERIAL: (5) Layout Stakes

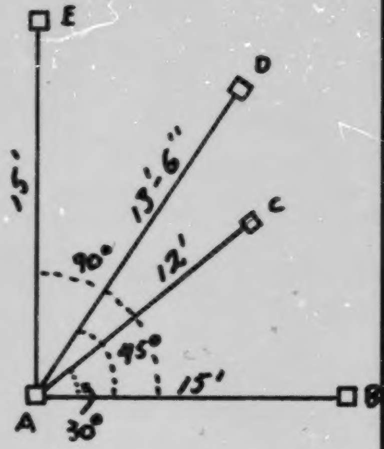
EQUIPMENT: Level-Transit

TOOLS: Sledge Hammer

SAFETY PRECAUTIONS:

Use care in handling instrument to prevent damage.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Drive stake in ground as shown at point "A" in sketch.	. SC-3-3
2. Set up level-transit over nail in center of stake.	. SC-3-6
3. Level instrument.	
4. Drive a stake at "B" a distance of 15' from stake "A".	
5. Sight instrument on nail on top of stake "B".	
6. Turn 30° angle to sight and locate stake "C", 12'-0" from stake "A".	. SC-3-7
7. Turn 45° angle to sight and locate stake "D", 13'-6" from stake "A".	NOTE: Always drive a 4d finish nail into top of stake to locate exact points.
8. Swing 90° angle to stake "E", 15'-0" from stake "A".	. SC-3-7
	. SC-3-7
	NOTE: Have work checked by instructor.



METHOD OF EVALUATION:

Work will be checked for correct angles and measurements.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-3-8

JOB: Establish Elevations on Stakes

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL: Stakes in place from J-3-7

EQUIPMENT: Level-Transit

SAFETY PRECAUTIONS:

Use care with level-transit.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set up level transit at convenient location near stakes.	. SC-3-6
2. Set rod on top of stake A and adjust target and cross hairs to coincide with each other.	NOTE: Make note of reading (elevation).
3. Determine elevation of stakes B, C, D and E, as in steps 2 and 3.	
4. Set target on rod to show same reading as the lowest stake elevation.	
5. Hold rod against each stake until target and cross hairs coincide.	
6. Make a pencil mark at the bottom of the rod.	
7. Repeat steps 6 and 7 and mark elevation on the side of all stakes.	NOTE: If required stakes may be driven down until, with rod set on top of stake, the target and cross hairs coincide. NOTE: Drive stakes carefully so as not to drive them down too far.

METHOD OF EVALUATION:

Job will be checked for instrument setup and stake elevations.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-3-9

JOB: Set Grade Stakes with Carpenter's Level

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL: Stakes set in J-3-7

TOOLS: Level
8' Straight Edge

SAFETY PRECAUTIONS:

Observe general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check straight edge and rest one end on top of stake driven to given elevation.	NOTE: Elevations will be given by instructor. Example: To height of lowest stake.
2. Set carpenter's level on top of straight edge at the center and bring straightedge level and against side of next stake.	. SC-3-8
3. Drive this stake down just to the bottom of the straightedge.	NOTE: As the stake nears the correct level use light blows with the sledge so stake will not be driven too far.
4. Properly set all remaining stakes by repeating the above procedures.	NOTE: If stake is driven too far, remove stake and push some dirt into the hole and drive stake again being careful not to go too far.

METHOD OF EVALUATION:

Tops of stakes will be checked for correct elevation.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-3-10

JOB: Set Stakes in Line

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL: (6) Layout Stakes
4d Finish Nails

EQUIPMENT: Level-Transit

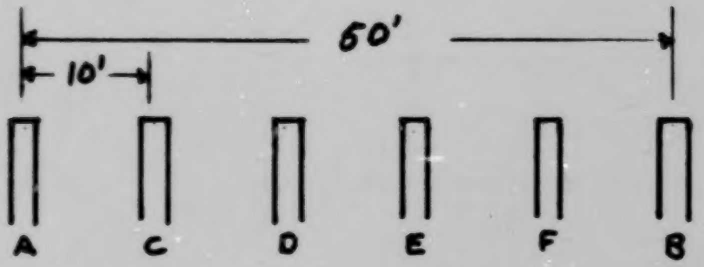
TOOLS: Sledge Hammer
Claw Hammer

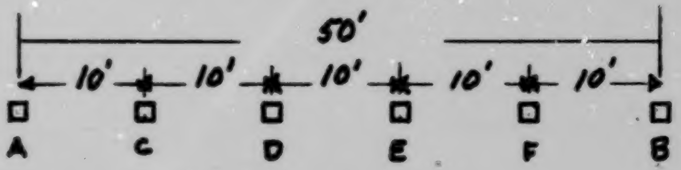
SAFETY PRECAUTIONS:

Observe general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare layout stakes and drive stake "A" into the ground.	. SC-3-1
2. Set up level-transit over stake "A".	. SC-3-6
3. Drive stake "B" into the ground 50 feet from "A".	. SC-3-3
4. Drive a 4d finish nail into the center of stake "B".	
5. Sight level-transit to nail on top of stake "B". Lock horizontal scale in this position.	. SC-3-7
6. Divide the 50 foot distance into five equal spaces each 10 feet apart.	
7. Make a mark on the ground at each 10 foot space.	
8. Sight the transit to the 10 foot mark "C" and drive a stake. Place a pencil mark on top of stake in line with vertical cross hair.	

9. Repeat steps 7 and 8 and drive stakes D, E and F. Place accurate marks on top of stakes in line with cross hair.


50'
10'
A
C
D
E
F
B


50'
10'
10'
10'
10'
10'
A
C
D
E
F
B

METHOD OF EVALUATION:

Work will be checked for accuracy of dimensions and alignment.

JOB: Drive Batter Board Stakes

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL: 2 X 4 Stakes from J-3-1
Building Layout from J-3-5

TOOLS: Sledge Hammer
Nailing Hammer
Dryline

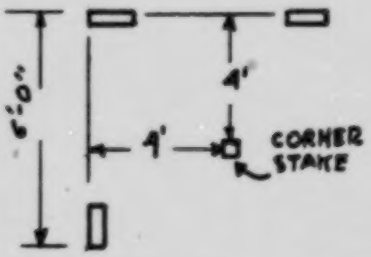
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-3-11

SAFETY PRECAUTIONS:

Be careful not to over swing and miss the stake. It could cause injury to the student as well as damage to the sledge handle.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Nail a piece of ½" thick plywood to the tops of the stakes (to prevent splitting).	
2. Drive batter board stakes at two corners to allow a line to be strung along one side of the building.	NOTE: Stakes should be set parallel to building line with a set back as shown.



METHOD OF EVALUATION:

The instructor will look at the finished work.

JOB: Establish Elevations for Batter Boards

JOB SHEET IDENTIFICATION CODE

UNIT III: Building Layout

JOB NUMBER: J-3-12

COURSE: Carpentry

MATERIAL: Batter Board Stakes from J-3-11

EQUIPMENT: Level-Transit
Rod & Target

TOOLS: Straight Edge
Carpenter's Level

SAFETY PRECAUTIONS:

Handle tools and instruments carefully not only for safety sake but also to protect them against damage.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set level-transit at some convenient point near building and within sight of datum point.	NOTE: Instructor will furnish elevation of datum point and elevation of batter boards with reference to datum point.
2. Level the instrument.	
3. Check elevation reading at datum point.	
4. Calculate difference between datum point elevation and desired batter board height from datum point.	
5. Set and secure target.	NOTE: If batter board height is above datum point subtract this amount from elevation reading in step 3. If batter board height is below datum point add this amount to reading in step 3.
6. Mark desired elevation on the side of each stake.	
7. If datum point is close enough to the building, use a straight edge and carpenter's level to establish desired elevation mark on one batter board stake.	. SC-3-8
8. Drive a nail into the side of the stake at this elevation so the straight edge can rest on it.	

9. Transfer this elevation mark to each remaining stake, using level and straight edge.

METHOD OF EVALUATION:

Work checked for accuracy of markings.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-3-13

JOB: Apply Batter Boards

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL:
(4) Pcs 1 X 6 X 6'-0" #2 White Pine
(2) Pcs 1 X 3 X 3'-0" (Braces)
(2) Pcs 2 X 3 X 1'-6" (Stakes)

TOOLS:
Claw Hammer
Level
Sledge Hammer

SAFETY PRECAUTIONS:

Observe all safety rules while on the job.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Nail one board in place with its end even with the outside of the corner stake and its top edge even with the elevation marks from J-3-12.	
2. Nail the second board in place on the adjacent side.	
3. Repeat this process on the other corner.	
4. On each set of batter boards, drive a brace stake into the ground approximately 2' back from the two outside stakes.	
5. Nail a piece of 1 X 3 to the batter board stake and to the brace stake.	NOTE: Have your work checked.

METHOD OF EVALUATION:

1. Alignment of stakes
2. Rigidity of batter boards
3. Boards level
4. Boards well nailed

JOB: Locate Building Lines on Batter Boards

JOB SHEET IDENTIFICATION CODE

UNIT III: Building Layout

JOB NUMBER: J-3-14

COURSE: Carpentry

MATERIAL: Batter Boards from J-3-13

TOOLS:
Carpenter's Level
Dryline
Hammer

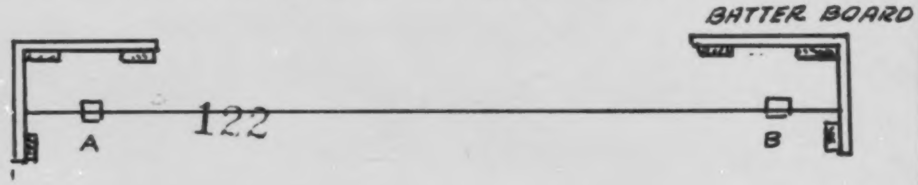
SAFETY PRECAUTIONS:

Observe general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Fasten a line to stake "B" and stretch it on top of the batter boards at stake "A".	
2. Having another person set a hand level on top of stake "A" beside the nail, take a piece of lath and rest the one end against the ground and the other side beside the level to brace it and to keep it plumb.	NOTE: Remember, it is important that the line is directly above the stake. Make sure you do not push the line too tightly against the level. Take your thumb and roll the line away from the level and then roll it back until it just touches.
3. Move the line along the top of the batter board until the line is very close to the same edge of the level that is against the nail. (Not touching but within 1/32")	
4. Mark the top edge of the batter board where the line crosses it.	
5. Follow this procedure to mark the other side.	NOTE: It is very important that this process is done very accurately because it is from these lines the excavator does his digging, the footers are put in, the foundation wall is put up and the first floor is framed.
6. Stretch and secure a line to the tops of the batter boards.	

METHOD OF EVALUATION:

Check line to make sure it is directly above the layout stakes.



JOB: Establish Reference Marks on Batter Boards

JOB SHEET IDENTIFICATION CODE

UNIT III: Building Layout

JOB NUMBER: J-3-15

COURSE: Carpentry

MATERIAL: Use Batter Boards from J-3-14

TOOLS: Crosscut Handsaw
Rule

SAFETY PRECAUTIONS:

Observe all safety rules while working on the job.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Check the layout for accuracy by measuring the diagonals.
2. Mark the top edge of the batter boards at the point where the building lines cross them.
3. Kerf the back edge of each batter board at the mark made in step #2.
4. Study the drawing of the foundation wall and footer.
5. Place reference marks on the batter boards for the following:
   - A. The inside of the foundation wall.
   - B. The outside of the footer.
   - C. The inside of the footer.

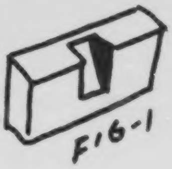


FIG-1

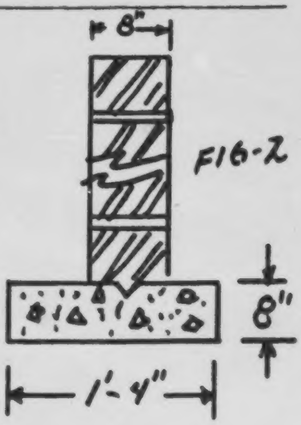
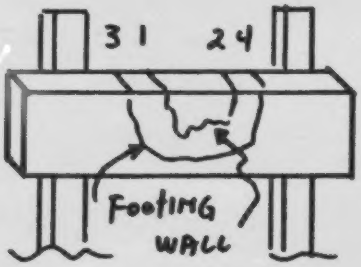


FIG-2



METHOD OF EVALUATION:

1. Accuracy of layout

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-3-16

JOB: Stake Out Building and Erect Batter Boards

UNIT III: Building Layout

COURSE: Carpentry

MATERIAL: 2 X 2 X 3' Stakes
2 X 4 X 4' Stakes
1 X 6 X 4' Batter Boards

EQUIPMENT: Level-Transit
Rod & Target

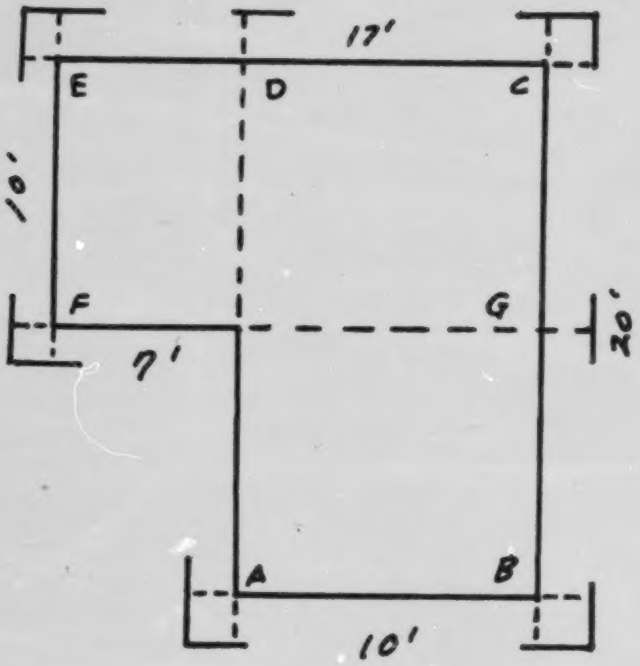
TOOLS: Hand Hatchet
Level
Steel Tape
Sledge Hammer

SAFETY PRECAUTIONS:

Observe general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Stake out main rectangle A, B, C, D, 10' X 20'. See sketch.	. SC-3-6, SC-3-7
2. Extend line C-D, 7' to E and drive a stake at this point.	NOTE: Corners may be squared using the level-transit or by the 6-8-10 method.
3. Measure from C along line C-D a distance of 10' and drive a stake at G.	. SC-3-3 and SC-3-4 NOTE: Recesses and projections are laid out in the same manner as a rectangular building. It will break the layout up into smaller rectangles.
4. Measure distance E-F, 10' and G-F, 17' and drive a stake at F to complete the offset.	. SC-3-3 and SC-3-4
5. Prepare batter board stakes.	. SC-3-1 and SC-3-2
6. Drive three stakes into the ground at all outside corners as shown.	. SC-3-1 and SC-3-2
7. Drive two stakes opposite corners A at D and two stakes opposite corner F at G.	. SC-3-1 and SC-3-2
8. Establish elevation on stakes.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
9. Prepare batter boards and apply to stakes.	NOTE: Brace stakes if necessary.
10. Transfer building lines to batter boards and stretch drylines.	
11. Check diagonals for accuracy.	
12. Establish permanent reference points and make saw kerfs.	
13. Attach building lines.	



METHOD OF EVALUATION:

Work will be checked while job is in progress and diagonals will be checked for accuracy.

JOB: Establish Guidelines for Excavation

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: Lime

TOOLS: Dryline
Plumb Bob

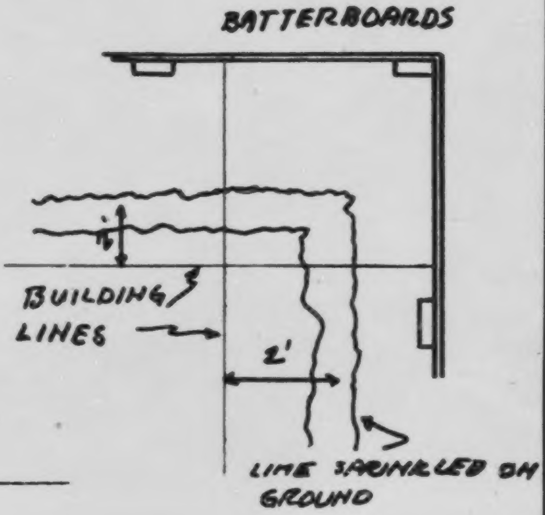
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-1

SAFETY PRECAUTIONS:

Caution: Do not get lime in eyes.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Stretch wall lines between batter boards.	NOTE: The instructor may provide a suitable set of plans for a small building to to be used as a sourse of dimensions and details for many many of the jobs and test projects to follow.
2. Use a plumb bob to plumb from wall lines to ground level.	
3. Measure from these points out 2 feet.	
4. Use lime to mark the ground all the way around the area to be excavated. The line should coincide with the measurement of Step 3 above.	NOTE: Batter boards will have been previously laid out to establish the area for excavation. . SC-4-1
5. Remove wall lines from batterboards so they will not interfere with excavating equipment.	



METHOD OF EVALUATION:

After a period of practice the instructor will check the student's guide lines against the plan.

JOB: Make a Story Pole for Excavation Depth

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 1 Piece, 1 X 2 X 10'-0"

TOOLS: Rule and Pencil

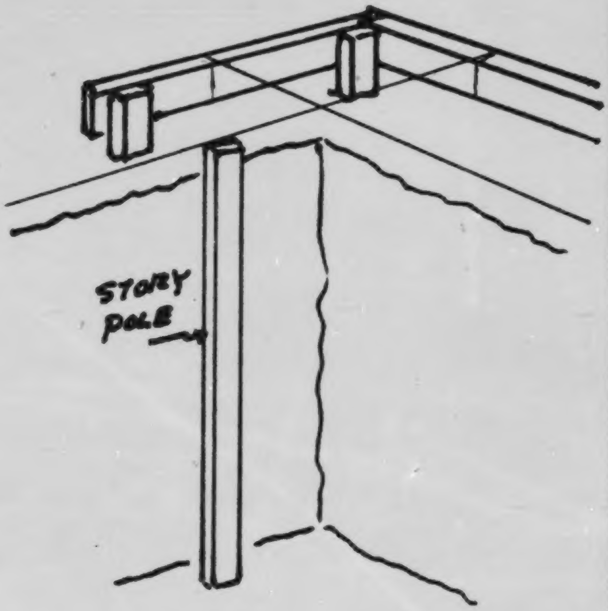
SAFETY PRECAUTIONS:

Observe general safety requirements.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-2

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Refer to plans to determine the depth of the foundation wall in relationship to the lines on the batter boards.	
2. Select a piece of thin stock (1" x 2" lath) that will extend from the top of the batter boards to the required foundation depth.	
3. Mark the required depth from 2 above, on the stock (1" x 2" lath).	
4. Cut the stock (1" x 2" lath) at this point.	



METHOD OF EVALUATION:

The instructor will check the accuracy of the measurement and layout of the story pole.

JOB: Plumb Building Corners Into Excavation

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 4 pieces, 1 X 2 X 1'

TOOLS: Plumb Bob
Stakes
Hatchet

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-3

DRAWING NO.: D-4-3

SAFETY PRECAUTIONS:

1. Observe hand tool safety.
2. Use ladder to go in and out of excavation.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Stretch building wall lines between batter boards.	NOTE: Exact corners may be marked on top of the stakes with nails and diagonals checked for accuracy. However this is usually done later on top of the footer.
2. Hook a plumb bob on the line and drop it into the excavation at one corner.	. SC-4-1
3. Mark this point with a stake driven into the ground.	
4. Repeat dropping the plumb bob at the remaining corners.	
5. Mark each corner with a stake.	

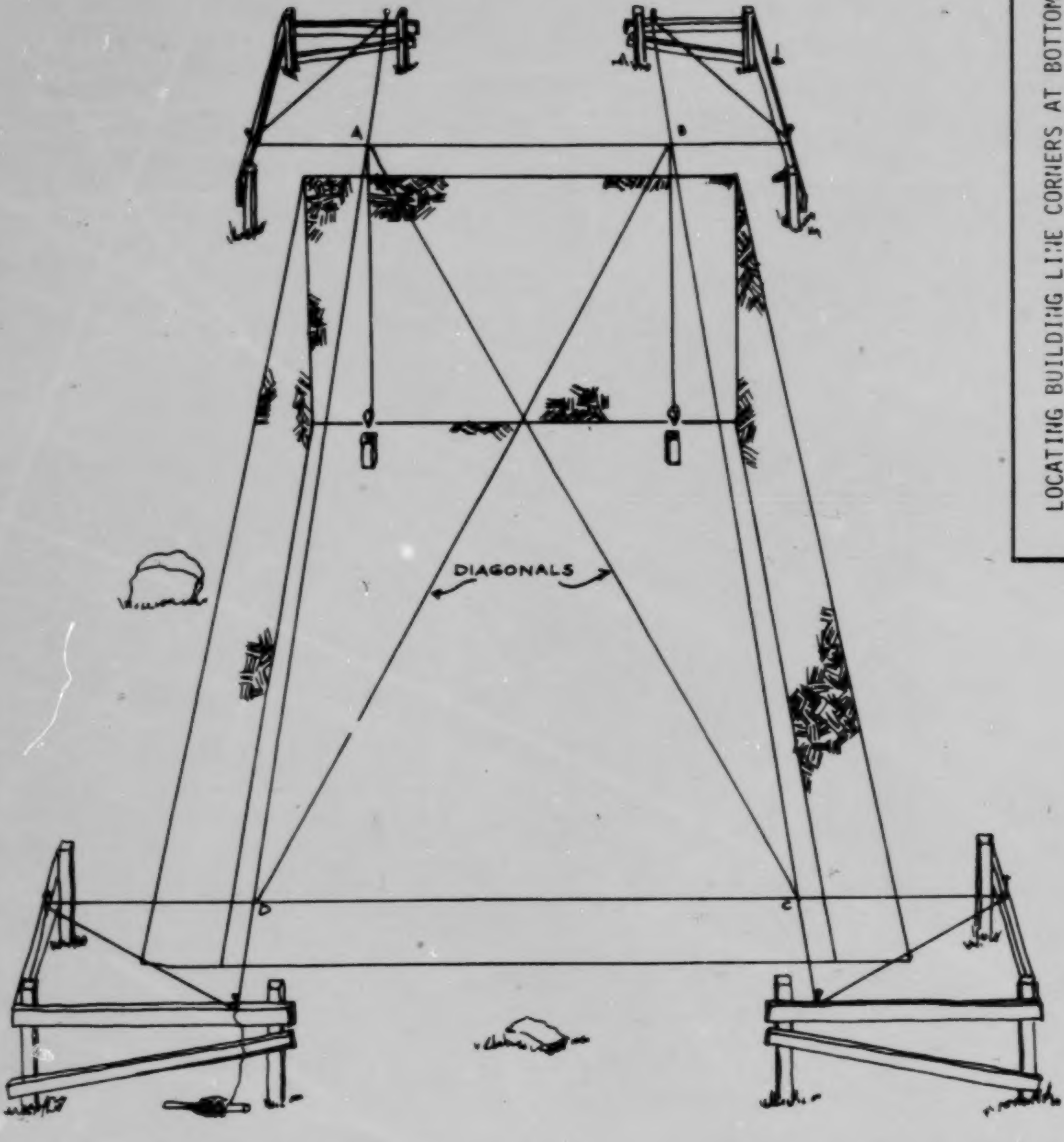
METHOD OF EVALUATION:

The instructor will check the accuracy of the student's work.

LOCATING BUILDING LINE CORNERS AT BOTTOM OF EXCAVATION

DRAWING NUMBER

D-4-3


A
B
DIAGONALS
D
C

JOB: Establish Footer Lines

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 X 2 or 2 X 4 Stakes

TOOLS: Rule
Sledge Hammer

SAFETY PRECAUTIONS:

Use care around excavations.

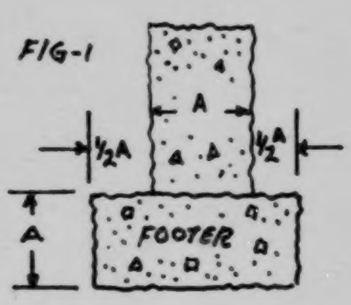
JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-4

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Check blueprints for the foundation wall thickness and see Fig. 1.
2. Measure from a corner stake toward the outside of the wall, 1/2 the thickness of the wall plus thickness of form material. Drive a stake at this point. (Fig. 2)
3. Repeat this operation at all corners of the building.
5. Recheck the footer points for accuracy.

FIG-1


A
½A
½A
A
FOOTER

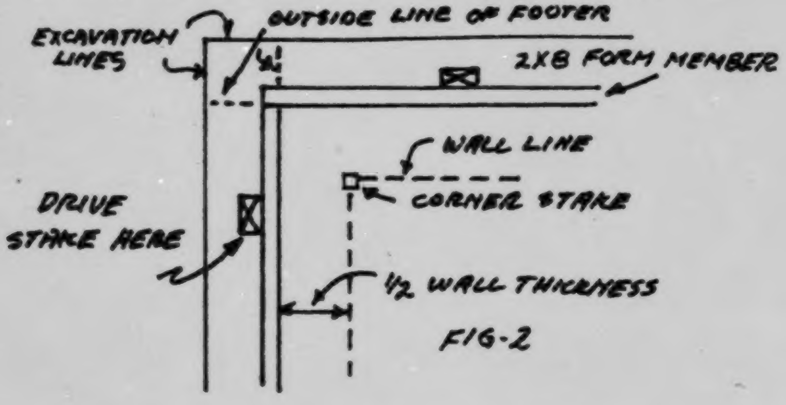

EXCAVATION LINES
OUTSIDE LINE OF FOOTER
½
2X8 FORM MEMBER
WALL LINE
CORNER STAKE
DRIVE STAKE HERE
½ WALL THICKNESS

FIG-2

METHOD OF EVALUATION:

The instructor will check the accuracy of the student's work.

JOB: Lay Out and Set Footer Forms

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-5

MATERIAL:
2 X 8 Stock for Forms
1" X 2 X 1' Stakes
2 X 4 X 1'-6" Stakes
1 X 2 X 2' Spreaders
1 X 2 X 2'-3" Ties

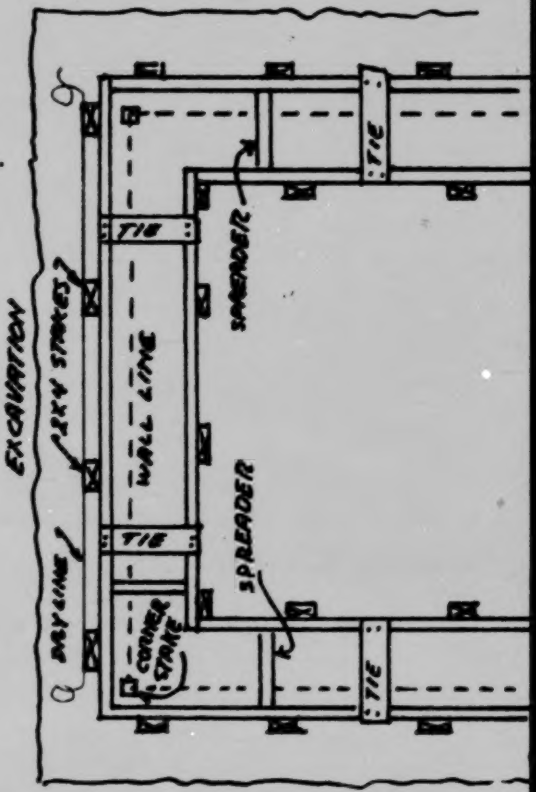
TOOLS:
Level
Sledge Hammer
Hatchet
Portable Electric Saw
Plumb Bob
Steel Tape
Straightedge

SAFETY PRECAUTIONS:

Observe all hand tool safety rules and use portable electric saw with care.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Stretch building lines on batter boards.
2. Plumb corners to bottom of excavation.
3. Drive a stake at each corner.
4. Use a story pole to determine height of footer. Set corner stakes to this elevation.
5. Establish footer lines and set 2 X 8 forms along the outside of this line.
6. Drive a stake at each end as shown and at intermediate points about every 4' and at splices.
7. Use dry line to check stakes and form work for alignment.
8. Bring form boards level with corner stakes and fasten by nailing through stakes.
9. Continue to set all outside forms straight and level.
10. Cut spreaders and form ties to length.
11. Set inside form sections in place against spreaders and drive stakes along inside form as shown.



12. Bring inside form sections level with outside forms and fasten by nailing through stakes.

13. Nail form ties in place to help stiffen forms and withstand pressure of concrete.

14. Check each step carefully to make sure forms are accurately positioned, level and straight.

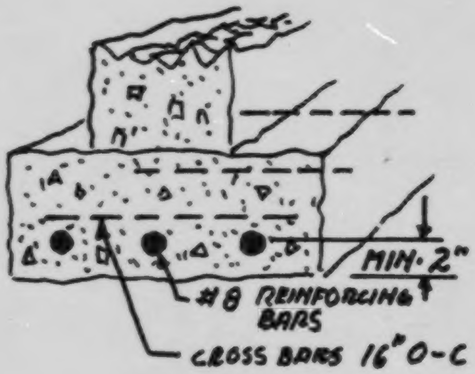
METHOD OF EVALUATION:

Have instructor check work for the above.

JOB:	Place and Tie Reinforcement Steel In Footers	JOB SHEET IDENTIFICATION CODE
UNIT IV:	Foundations and Concrete Forms	JOB NUMBER: J-4-6
COURSE:	Carpentry	
MATERIAL:	#8 Reinforcing Steel Rods	
TOOLS:	Bolt Cutters	

SAFETY PRECAUTIONS:

1. Use care in handling long, heavy material.
2. Use cutting tools carefully.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut reinforcing rods to desired length with a bolt cutter.	NOTE: Rods may also be cut part way with a hacksaw and then broken off or they may be cut with a welding torch.
2. Lay rods along footer as per specifications.	
3. Cut cross bars to length and place across longitudinal bars at specified spacing.	. SC-4-3
4. Tie both long and short bars together at all intersections with form tiewire.	
5. Raise bars up to specified height using stones, pieces of brick or concrete blocks. Maintain minimum of 2" of concrete around all steel.	

METHOD OF EVALUATION:

Work will be checked for proper spacing and placement.

JOB: Build and Set a Pier Footer Form

JOB SHEET
IDENTIFICATION CODE

UNIT IV: Foundations and Concrete Forms

JOB NUMBER: J-4-7

COURSE: Carpentry

MATERIAL:
1" Boards (Form Sides)
1 X 3 Stakes
2 X 2 Stakes

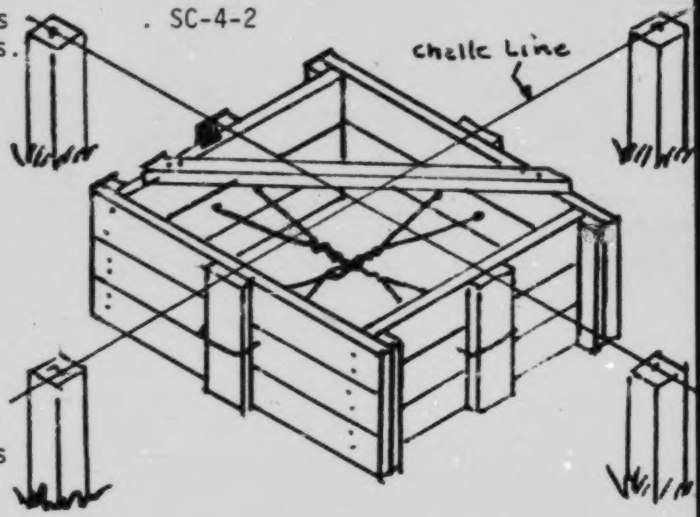
EQUIPMENT: Hand Electric Saw

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

1. Care in the use of the hand electric saw
2. Wear eye protection.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut boards to length needed for sides of forms, 24" X 24" inside dimensions.	. SC-4-2
2. Put cleats on if needed to increase the width.	
3. Nail form together.	
4. Locate and mark the centers on the sides of the form.	
5. Set 4 stakes at right angles to each other at a distance larger than measurement of form.	
6. Stretch lines on stakes where form is to be placed.	
7. Place the form directly below the lines, so that each center mark is directly under the line.	
8. Level the pier form and check its location as to center lines.	
9. Stake and brace the form, or use tie wire as shown in sketch twisting wires in the center as shown.	



METHOD OF EVALUATION:

1. Layout procedures
2. Accuracy
3. Strength of form

JOB: Construct A Step Footer Form

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-8

MATERIAL: 2 X 8 Stock
1 X 4 Stock
2 X 2 Stakes
10d Nails

EQUIPMENT: Portable Electric Saw

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

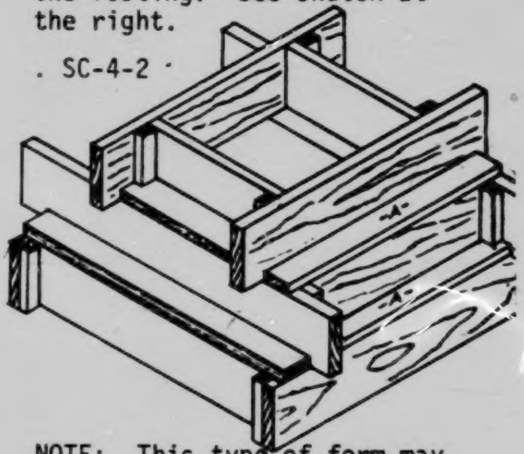
Observe safety rules for portable electric tools as well as hand tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

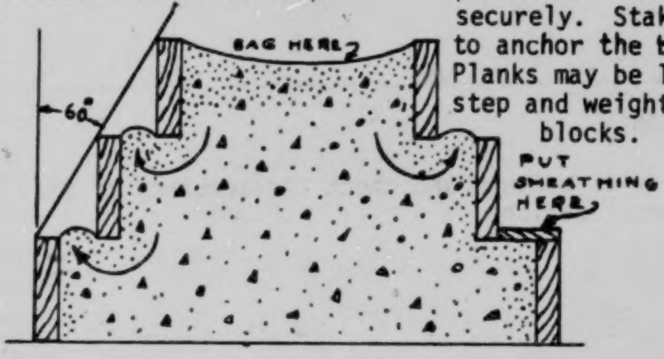
1. Build and set the form for the first step using the same procedure used in building a pier form. Size is based on specifications. See dimensions below.
2. Secure the smaller second section of the form on top of the first, or lower second.
3. Secure the third section, which is smaller than the second, on top of the second section.
4. Build and install additional steps called for in specifications as per Step 3 above.
5. Secure sheathing boards over the side openings at the top of each step of the form.
6. Brace and anchor each section to keep it from moving.

NOTE: The stepped form is a series of individual forms made to the required size of the footing. See sketch at the right.

. SC-4-2 ·



NOTE: This type of form may lift or move from desired position if not anchored securely. Stakes may be used to anchor the bottom section. Planks may be laid on bottom step and weighted with concrete blocks.



SECTION OF STEPPED FORM

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

The instructor will measure and check the accuracy of this form as compared to specifications.

JOB: Establish Wall Lines on Footers

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

TOOLS: Plumb Bob
Chalk Line

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-9

SAFETY PRECAUTIONS:

Use ladder to get in and out of excavation.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Stretch lines on batter boards.	. SC-3-5
2. Hook a plumb bob on the line at all corner intersections.	. SC-4-1
3. Drop into excavation on top of footers.	
4. Mark each corner or drive a masonry nail at this point.	
5. Take a chalk line and hold it on these marks and snap it so as to mark the outside wall line all around the building.	. SC-4-4

METHOD OF EVALUATION:

The instructor will check the accuracy of the layout.

JOB: Construct Wall Form Panel

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-10

MATERIAL:
1 Piece, 1/2 X 4' X 8' Exterior Plywood G1S
5 Pieces, 2 X 4 X 8'
16d Common Nails
6d C-C Box Nails

EQUIPMENT: Portable Saw

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

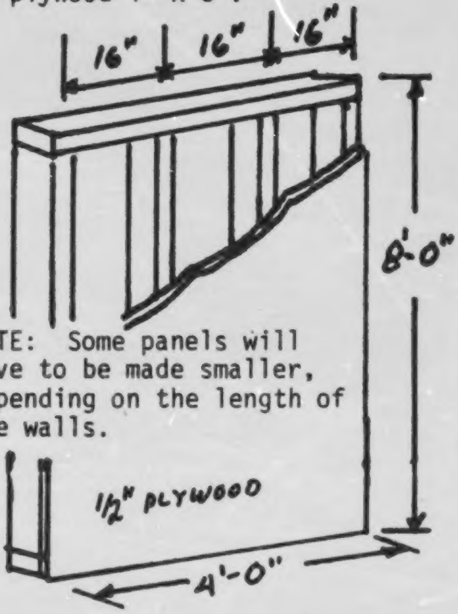
Observe all power tool safety rules.

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Cut two 2 x 4's 4 feet long for top and bottom plate.
2. Lay off the 16" O.C. spacing on the two plates.
3. Cut 4 studs 8' less thickness of the two plates.
4. Nail studs and plates together to form a 4' x 8' frame with the studs spaces 16" O.C.
5. Lay a sheet of plywood on top of framing; square and nail the plywood to the frame.
6. Build the required panels needed for the walls.

TEACHING/LEARNING ACTIVITIES

NOTE: Panels are usually built to the size of a sheet of plywood 4' x 8'.



NOTE: Some panels will have to be made smaller, depending on the length of the walls.

METHOD OF EVALUATION:

The instructor will measure and physically inspect the results of the students work.

JOB: Set Outside Wall Form

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-11

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 X 6 X 16 Several Wall Form Panels
2 X 4 Braces
2 X 4 Stakes

EQUIPMENT: Portable Saw

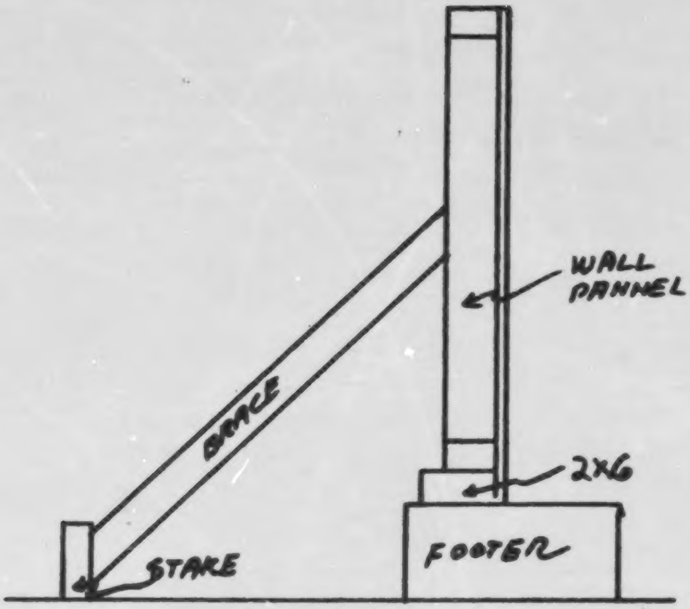
TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

1. Use care while working around excavation.
2. Observe power tool safety.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Plumb down from building lines to locate corners.	. SC-4-1
2. Snap a chalk line on the footer between points marking the outside of the foundation wall.	NOTE: The outside wall form is usually set first because of the inconvenience of working in a small area between the form and the ground wall. Usually this distance is about 2 feet.
3. Position a 2 X 6 with the inside even with this line, all around the building.	
4. Nail the 2 X 6's with steel masonry nails to this line, all around the building.	. SC-4-10
5. Set forms on top of the 2 X 6's, keeping them even on the inside.	
6. Nail through the plate of the form into the 2 X 6 plate with duplex nails.	
7. Continue to set form panels until all units for that side have been set and nailed fast to the 2 X 6 and to each other.	
8. Construct odd size panels where needed to complete a side.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
9. Plumb both ends of wall form and apply braces.	. SC-4-1
10. Align panels using line and blocks.	. SC-4-5
11. As panels are brought into alignment, add additional bracing as required.	
12. Lay out and bore holes in forms for wall ties and spreaders.	



METHOD OF EVALUATION:

The instructor will:
1. check for proper measurement by the student.
2. check neatness of work.
3. check for proper use of hand tools.

JOB: Construct and Set Box Form For Opening In Concrete Wall
UNIT IV: Foundations and Concrete Forms
COURSE: Carpentry
MATERIAL: 1 Piece, 1 X 6 X 26
1 Piece, 1 X 4 X 26
EQUIPMENT: Jointer
Portable Electric Saw
TOOLS: Basic Hand Tools

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-12

SAFETY PRECAUTIONS:

Use special care in operating the jointer for beveling.

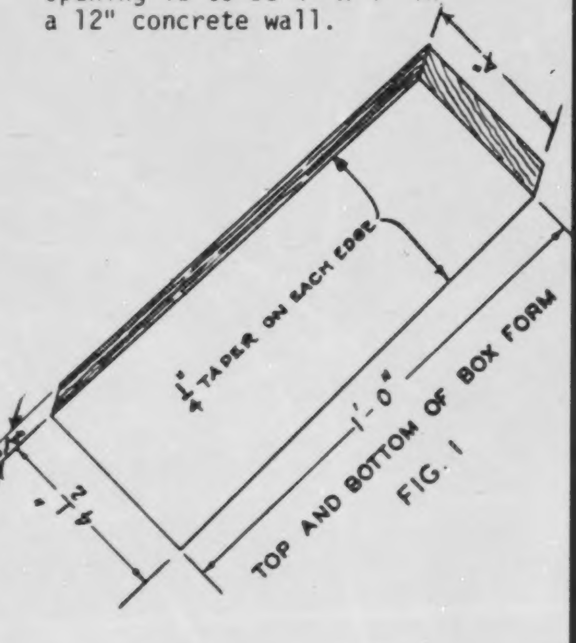
COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Check plans for the size of the various openings in the wall.
2. Cut two pieces 3/4" x 4-1/2" x 12" and taper them as shown in Figure 1. These are to be used for the top and bottom of the box form.
3. Cut two pieces 3/4" x 3" x 12" and taper them as shown in Figure 2. These are to be used for the two sides of the box form.
4. Assemble the four pieces as shown in Figure 3, using 6d nails. The assembled box should then measure approximately 4" x 4" on one end, and 4-1/2" x 4-1/2" on the other.
5. Round off the outside corners of the box.
6. Cover the outside surface of the box with grease or similar material.
7. Place the box form in the proper position in the concrete form, Figure 4.
8. Hold the box in position in the form by driving nails through the sheathing into the ends of the box. Do not drive the nails all the way into the wood, but allow the heads to stick out beyond the surface so they can be pulled out easily when taking the forms off the concrete wall.

TEACHING/LEARNING ACTIVITIES

NOTE: Openings are formed by making rectangular box-like forms of wood to the size of the openings to be left in the concrete wall.

Assume that it is desired to make a form for an opening for a support running into the wall or a pipe through the wall. The opening is to be 4" x 4" in a 12" concrete wall.



TOP AND BOTTOM OF BOX FORM

FIG. 1

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

The instructor will inspect the finished installation of the bucks visually and by measurement.

JOB: Set and Tie Reinforcement In Forms

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: Reinforcing Rods as Per Specifications
#12 or #14 Tie Wire

EQUIPMENT: Bolt Cutters

TOOLS: Basic Hand Tools

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-13

SAFETY PRECAUTIONS:

Use care in handling bolt cutters and cut rods.

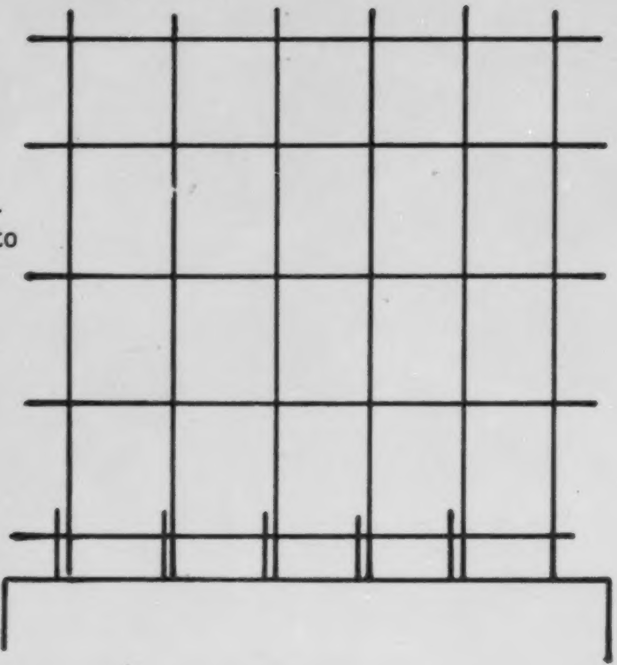
COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Check the plans to determine what size rods and how many are to be placed in the wall.
2. Tie the first horizontal rod to the steel bars extending above the footer.
3. Make a mark on this horizontal bar where each vertical bar is to be placed.
4. Set the vertical bars on the footer and tie to the horizontal bar at each mark.
5. Proceed around the wall until all the vertical bars are placed and tied.
6. Measure the distance where the top horizontal bar is to be placed, and tie it to the vertical bars.
7. Lay off for the other horizontal bars and tie them in place.

TEACHING/LEARNING ACTIVITIES

NOTE: Usually when steel is placed in concrete walls, steel rods were placed in the footer and are sticking out of the footer to fasten the steel for the wall to it.

IL-4-19



METHOD OF EVALUATION:

The instructor will visually inspect the finished work.

JOB: Apply Walers and Braces

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 X 4 X 16's Walers (Straight)
2 X 4 Blocks as Shown

EQUIPMENT: Portable Saw

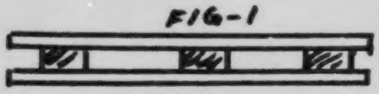
TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Use care in handling heavy form sections.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-15

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare the walers as shown in Fig. 1.	FIG-1 
2. Cut 2 X 4 blocks and fasten the walers together as shown in Fig. 1.	
3. Slip the walers over the ends of the wall ties.	
4. Put the wedge clamps over the ends of the wall ties and drive them down until the waler is tight against the studs on the wall form. This should pull the form work in line if the walers are reasonably straight.	
6. Recheck alignment of walls and apply braces to inside of wall forms.	. SC-4-5
7. Complete nailing box forms for openings in wall.	

METHOD OF EVALUATION:

Forms will be checked for alignment rigidity and correct dimensions.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-16

JOB: Install Anchor Bolts in Concrete Forms

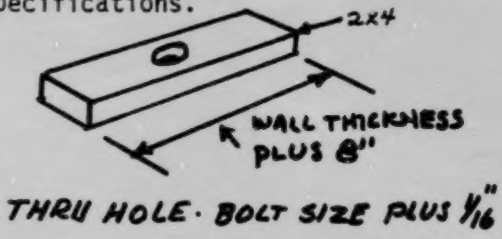
UNIT IV: Foundations and Concrete Forms

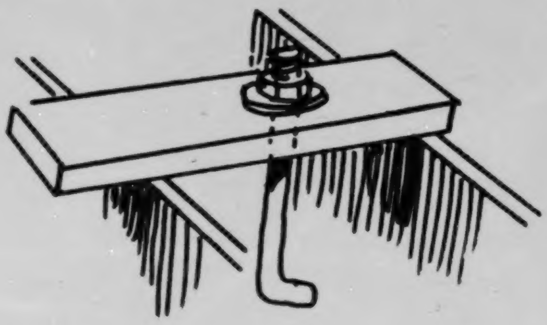
COURSE: Carpentry

MATERIAL: Anchor Bolts
10d Duplex Nails
2 X 4 Material

TOOLS: Basic Tool Kit

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Refer to blueprints and specifications.
1. Determine from prints the location of the anchor bolts.	
2. Prepare bolt holders as shown in sketch.	
3. Set bolt holders across top of form and nail in place.	
4. Set anchor bolts in bolt holders and apply nut and washer.	





METHOD OF EVLAUATION:

1. Interpretation of drawings
2. Placing of bolts

JOB:	Build and Set Forms for Door Openings in Concrete Walls	JOB SHEET IDENTIFICATION CODE
UNIT IV:	Foundations and Concrete Forms	JOB NUMBER: J-4-17
COURSE:	Carpentry	
MATERIAL:	2" Framing Plywood or Sheathing Boards	
EQUIPMENT:	Saw Horses	Hand Electric Saw
TOOLS:	Basic Tool Kit	

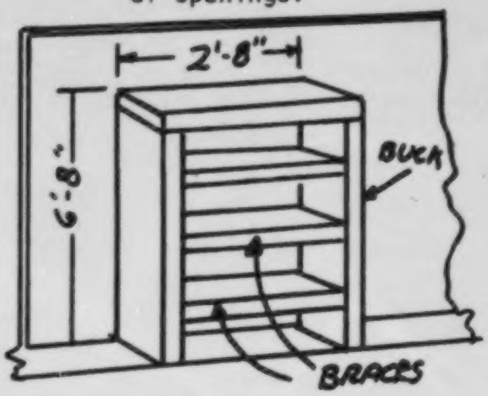
SAFETY PRECAUTIONS:

Care in the use of the electric saw.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

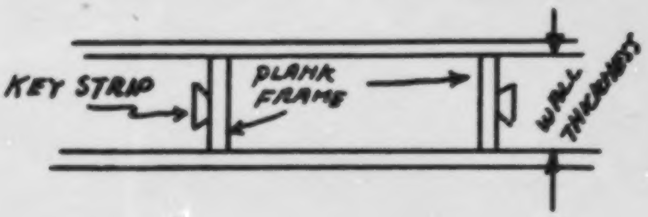
1. Determine exact size and location of openings.
2. Construct form to fit the inside of the opening.
3. Nail beveled key strips to back of jambs which will remain in the opening after the concrete is poured.
4. Fasten opening form inside of foundation panels with cleats.
5. Fasten the forms to panels and brace securely so that the pour will not push the form out of shape.

NOTE: Read plans for sizes of openings.



METHOD OF EVALUATION:

1. Interpretation of drawings
2. Form construction
3. Accuracy of form placement



JOB: Construct Concrete Wall Forms

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-18

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 X 4 Framing
Sheathing Boards or 3/4" Plyform

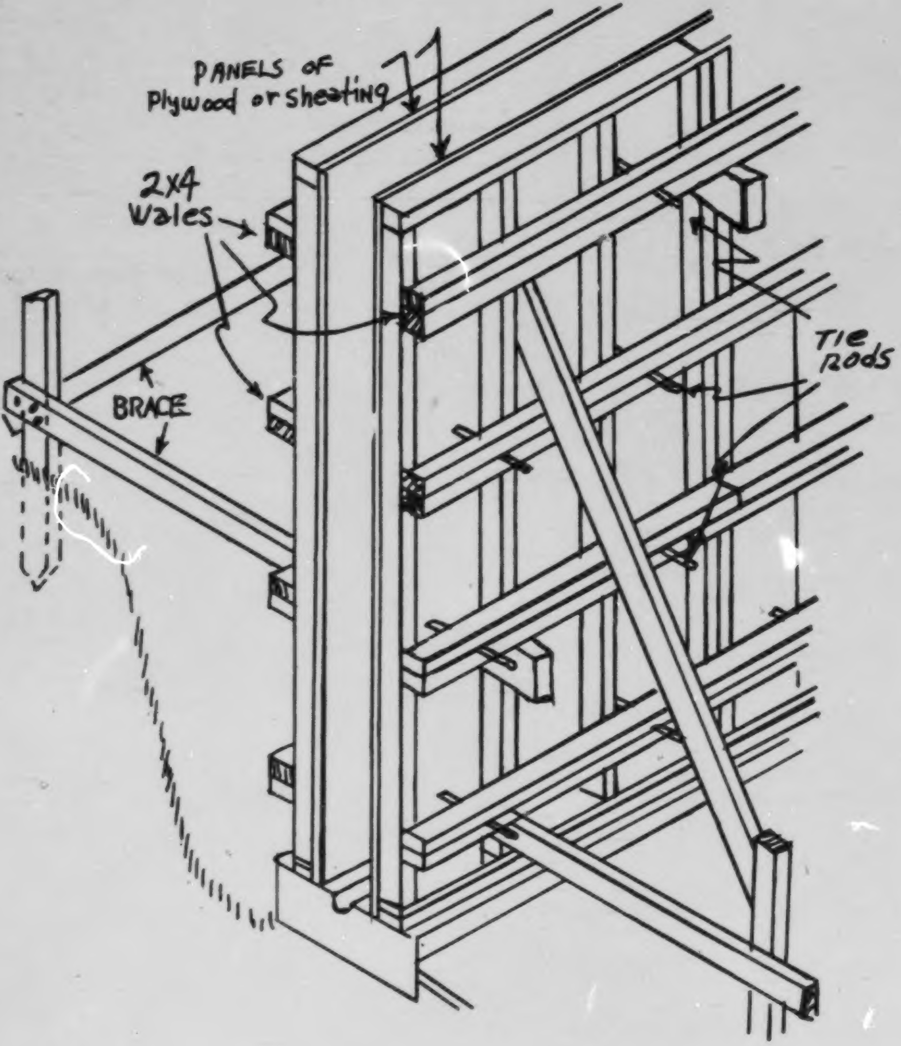
EQUIPMENT: Hand Electric Saw   Set Saw Horses

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

1. Care in the use of the electric saw
2. Care in the lifting and handling of heavy forms

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Check foundation plan for the amount of wall forms needed.
1. Measure wall lengths and cut top and bottom plates.	
2. Lay out plates for 16" O.C. spacing.	
3. Cut studs to required lengths.	. SC-4-2
4. Nail studs to plates.	
5. Lay plyform on studs and nail fast.	
6. Set and temporarily brace outside wall forms.	. SC-4-1, SC-4-4
7. Set openings bucks.	. J-4-17
8. Place steel.	. SC-4-3
9. Install wall ties and spreaders.	
10. Frame and erect inside wall forms.	. J-4-14
11. Install wallers and straighten forms.	. SC-4-5
12. Align and brace forms.	


PANELS OF
Plywood or sheating
2x4
Wales
BRACE
Tie
Rods

METHOD OF EVALUATION:

1. Size and shape of panels
2. Layout
3. Build-up of forms
   a. sequence
   b. bracing
4. Accuracy and strength of finished forming

JOB: Set Form For a Concrete Sidewalk

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 X 4 X 16 Form Material
1 X 2 X 12" Stakes

EQUIPMENT: Portable Power Saw

TOOLS: Basic Tool Kit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-19

SAFETY PRECAUTIONS:

Observe all general safety rules for power and hand tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut 2 X 4's for the sides of the form.	
2. Cut 2 X 4's four feet long for ends and for spreaders.	
3. Place the side pieces in position and drive a stake into the ground near one end.	
4. Determine the required elevation of the top of the sidewalk at this end. Mark this point on the stake and nail the side piece to the stake so that the top of the side piece coincides with the mark.	
5. Level the side piece, or pitch it according to the drainage required for the sidewalk. Fasten the second end of the side piece to a stake.	
6. Stretch a dry line from one end stake to the other and align the edge of the side piece with the dry line.	
7. Drive stakes every 3' along the side piece and nail them to it.	
8. Repeat the same procedure for the other side of the form. Generally this side is made level with the first.	
9. Prevent the sides of the form from being crowded together by placing spreader pieces where the joints in the panels are to occur.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
10. Nail the end pieces of the form in position, keeping the top edges even with those of the sides.	
11. Test the top and side edges of the completed form with a straight edge and make any necessary adjustments.	
12. Pack earth around the outside and bottom edges of the form to keep it from moving if it is stepped on.	

METHOD OF EVALUATION:

Forms will be checked for alignment, rigidity and correct dimensions.

JOB: Construct Runways and Pouring Chutes

JOB SHEET IDENTIFICATION CODE

UNIT IV: Foundations and Concrete Forms

JOB NUMBER: J-4-20

COURSE: Carpentry

MATERIAL: 2" Framing Lumber

TOOLS: Basic Hand Tools Portable Saw

SAFETY PRECAUTIONS:

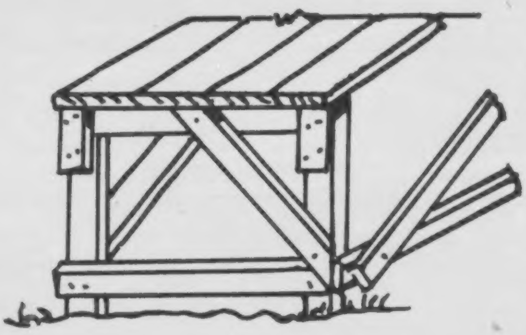
1. Exercise caution when going up or down the ramps.
2. Build the runways and ramps strong and safe to carry the weight.

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

PLATFORM TYPE SCAFFOLD:

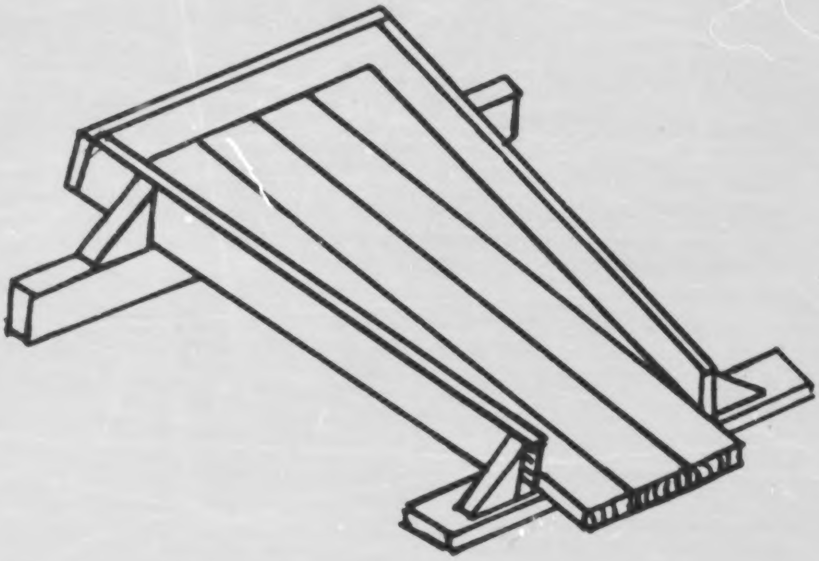
1. Stretch a dry line horizontally at the desired height above the concrete pour.
2. Measure to ground for length of posts.
3. Subtract the thickness of planking and ledger to arrive at length of posts.
4. Nail ledgers to posts with scabs.
5. Erect and brace platform.
6. Lay 2" thick planks on ledgers and tack to keep them from moving.
7. Erect a 3' high guard rail to meet OSHA standards.



POURING CHUTE:

1. Cut 1" x 6" floor boards to desired lengths.
2. Rip 1" x 6" diagonal floor boards.
3. Nail bottom to a 1" x 6" and 2" x 4" cleat.
4. Cut and nail side boards around floor boards.

5. Re-inforce side boards with 45° angle supports.



METHOD OF EVALUATION:

1. Ramp and runway layout
2. Erection procedures
3. Strength of construction
4. Meet safety requirements

JOB: Build Wheeling Ramp

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2" Framing Material

EQUIPMENT: Power Saw
Sawhorses

TOOLS: Basic Hand Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-21

SAFETY PRECAUTIONS:

1. General safety
2. Hand tool and power tool safety

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Stretch a line to the desired slope which will permit the transporting of a full wheelbarrow of concrete up the incline.	NOTE: A ramp is built the same as runways except the supporting members vary in height.
2. Divide evenly so the sections are not more than 7 feet apart.	
3. Measure to the ground from the line at these points.	
4. Subtract the thickness of the ledger to arrive at the length of the posts.	
5. Cut posts.	. SC-4-2
6. Cut ledger the desired width of ramp.	
7. Nail ledgers to posts with scabs.	
8. Erect and brace.	
9. Lay 2" thick planks on ledgers and tack to keep them from moving.	
10. Erect a 3 foot high guard rail to meet OSHA standards.	

METHOD OF EVALUATION:

The instructor will visually inspect, measure against specifications, and walk on ramp to check the quality of the students work.

JOB: Set Door and Window Bucks In Masonry Wall

JOB SHEET IDENTIFICATION CODE

UNIT IV: Foundations and Concrete Forms

JOB NUMBER: J-4-22

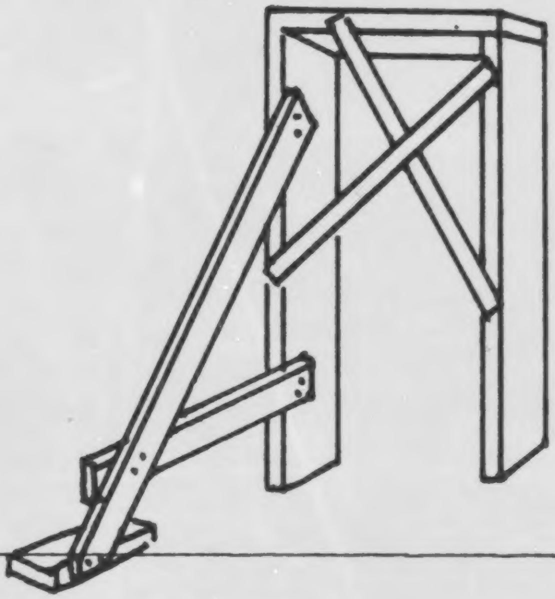
COURSE: Carpentry

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

1. Observe general safety around building site.
2. Use tools safely and properly.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Find the location for the door.	
2. Set on blocks to allow for the thickness of the floor.	NOTE: Windows are set in the same way, except you have to wait until the blocks are laid up to window sill height and then proceed the same way.
3. Level the head jamb.	
4. Plumb the sides and brace.	NOTE: Make sure you put your braces on one side and out of the way so they don't get bumped.



METHOD OF EVALUATION:

The instructor will check step #1, against the plan, by measuring. Check by leveling top and plumb sides.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-23

JOB: Lay Out and Cut Stair Form Stringer

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 Pieces, 2 X 12 Stock

EQUIPMENT: Portable Power Saw

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

Use power saw carefully.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Measure total height of stairway.	. IL-4-22
2. Measure or determine total run.	
3. Determine unit rise, or riser cut.	
4. Determine unit run or tread cut.	
5. Set framing square to run and rise figures.	
6. On a 2 X 12 stock, lay out required number of treads needed for the stairs.	NOTE: The stair carriage for concrete step forms will be inverted and set up over the steps to support the risers.
7. Cut out stair form carriage. Use this carriage as a pattern to lay out second carriage.	
8. Use portable electric saw to cut out carriages.	

METHOD OF EVALUATION:

The instructor will measure, check for squareness, check rise and run.

JOB: Construct Forms for Concrete Steps (Closed)

JOB SHEET IDENTIFICATION CODE

UNIT IV: Foundations and Concrete Forms

JOB NUMBER: J-4-24

COURSE: Carpentry

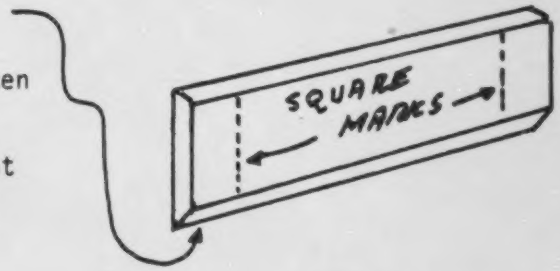
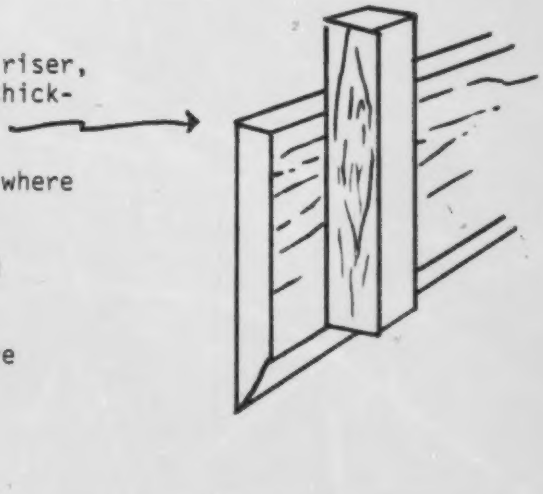
MATERIAL: 2 X 4's for Braces
2 X 8's for Risers
2 X 10 or 12's for Stringers

EQUIPMENT: Electric Hand Saw

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

1. Care in using the electric saw
2. Wear eye protection

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine rise and run.	. SC-4-7
2. Cut risers to proper width with a 45° bevel cut along one edge.	
3. Hang a stringer on each side and fasten securely to stakes driven in ground.	
4. Measure distance between walls and cut riser to this length.	
5. Mark thickness of carriage in from each end of riser.	
6. Nail vertical hanger pieces to each riser, in from each end of the riser, the thickness of the stringer. (See sketch)	
7. Put a vertical mark on the stringer where each riser is to be placed.	
8. Set first riser to proper height and nail to stringer.	
9. Repeat procedure until all risers are set in place.	
10. Brace and secure forms.	

METHOD OF EVALUATION:

Job will be checked for accuracy and rigidity.

JOB: Construct Forms for Concrete Steps (Open)

JOB SHEET IDENTIFICATION CODE

UNIT IV: Foundations and Concrete Forms

JOB NUMBER: J-4-25

COURSE: Carpentry

MATERIAL:
2 x 4's
2 x 8's
1 x 6's
2 x 12's

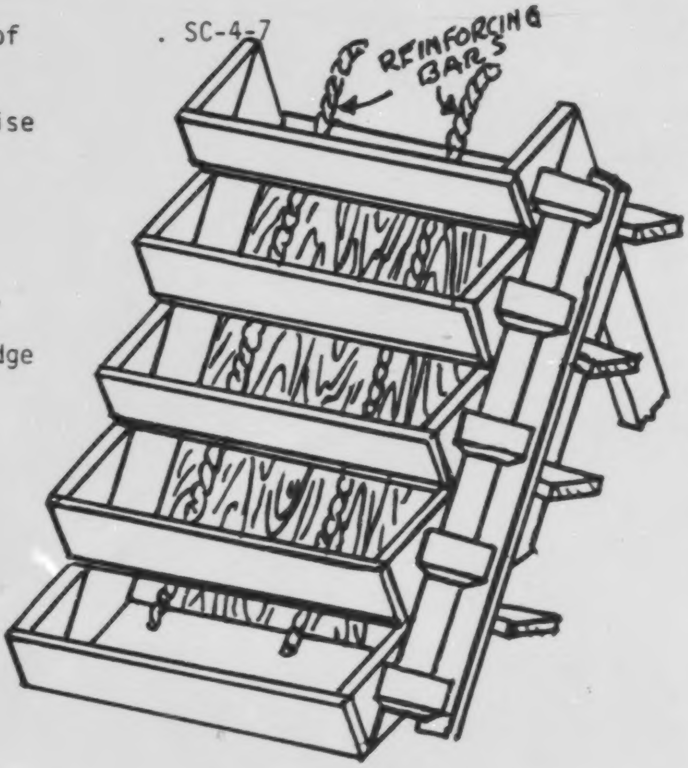
EQUIPMENT: Hand Electric Saw

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

1. Care in the use of the electric hand saw
2. Wear eye protection

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine rise and run.	. SC-4-2
2. Build a platform for the underside of the steps.	. SC-4-7
3. Lay out and cut two stringers for rise and run.	
4. Nail stringers to platform.	
5. Cut risers to length and width and bevel bottom edge approximately 45°.	
6. Nail risers to stringers, beveled edge down, and out. Set braces.	
7. Place reinforcement steel in form.	



METHOD OF EVALUATION:

1. Layout
2. Accuracy of cuts
3. Installation
   a. accuracy
   b. strength
   c. appearance

JOB: Set Forms for Concrete Floors and Slabs

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

MATERIAL: 2 X 4 Framing Planks
1 X 3 Lath for Stakes

TOOLS: Basic Tool Kit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-4-26

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check plans for thickness and height of pour.	
2. Establish elevations.	. SC-3-6
3. Set outside perimeter forms.	
4. Level forms.	
5. Align and brace forms.	
6. Set screeds.	
7. Place reinforcement.	
8. Build runways and ramps.	

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Layout
3. Forms accuracy and strength

JOB: Strip, Clean and Store Concrete Form Material

JOB SHEET IDENTIFICATION CODE

UNIT IV: Foundations and Concrete Forms

JOB NUMBER: J-4-27

COURSE: Carpentry

TOOLS:
Claw Hammer
Wrecking Bar
Scraper

SAFETY PRECAUTIONS:

1. Watch out for nails in boards.
2. Use care in using wrecking bar.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Remove braces.	NOTE: Remove nails at every step before laying piece on ground.
2. Remove tie clamps.	
3. Remove walers.	
4. Remove forms.	
5. Lay forms down and use a scraper to remove concrete.	
6. Sweep clean.	
7. Spray with a form oil.	
8. Stack on a neat pile until ready to use again.	
9. Put all clamps in a container.	
10. Stack walers and braces in a neat pile.	

METHOD OF EVALUATION:

1. The instructor will check the forms for cleanliness.
2. And check the general finished clean up process.

JOB: Rub Concrete After Form Removal

UNIT IV: Foundations and Concrete Forms

COURSE: Carpentry

TOOLS: Wood Float
Carborundum Stone
Brush

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-4-28

SAFETY PRECAUTIONS:

Be on guard for unexpected hazards even though work seems safe.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Wet the concrete with a brush where forms have been removed.	
2. Rub the surface with a carborundum rubbing stone.	
3. Fill larger openings with a sand and cement mix (grout).	
4. Rub until you work up a paste-like material on the surface. Surface should be smooth and even.	
5. Use a damp dry brush over the area just rubbed.	

METHOD OF EVALUATION:

1. Proper technique
2. Neatness of finished work

JOB: Lay Out for Anchor Bolts

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: (2) Pcs 2 X 6 X 8'-0" Foundation Wall Mock-up

TOOLS: Framing Square
Rule

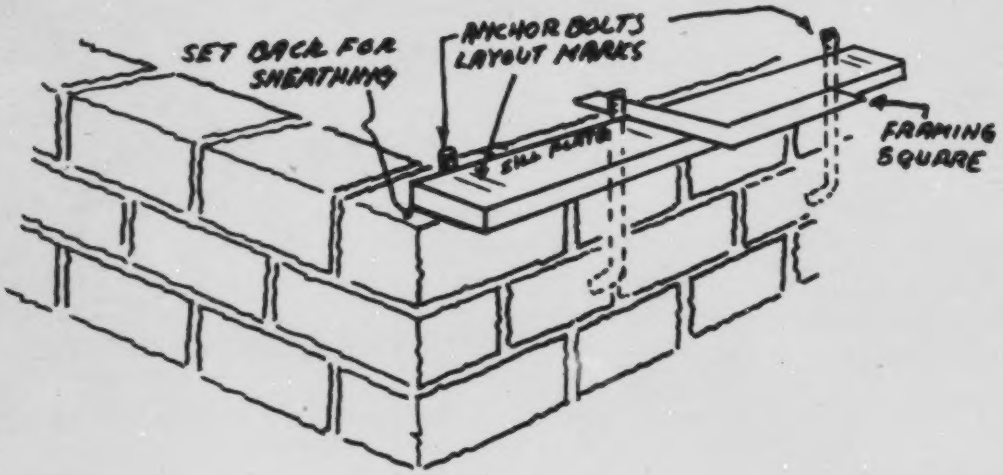
JOB SHEET IDENTIFICATION CODE

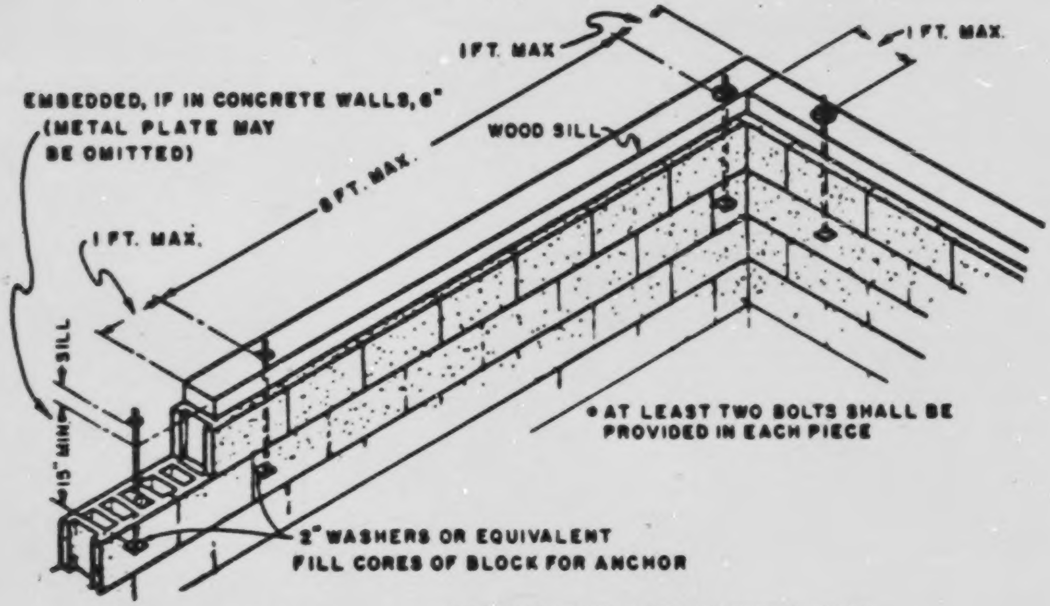
JOB NUMBER: J-5-1

SAFETY PRECAUTIONS:

1. Be careful while working around excavations.
2. Be careful while working with and lifting materials.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay the first piece of sill plate (cut to length) on top of the foundation wall as shown. 2. Using a framing square, mark the location of each anchor bolt along the sill plate. Mark both sides as shown.	NOTE: Make sure the end of the sill plate is held in from the face of the adjacent walls to allow for sheathing. The sill plate should be held up against the anchor bolts for marking their location.
3. Place the next piece of sill plate against the first piece and continue to mark the location of the anchor bolts.	
4. When the sill plate has thus been laid out for one side of the building, place the plates on sawhorses nearby.	
5. Measure the distance from the face of the foundation wall to the center of each anchor bolt, subtract the thickness of the exterior sheathing from this measurement and mark this distance from the outer edge of the sill plate to locate the center of each anchor bolt. 6. When all holes are accurately located, have your work checked.	NOTE: Because the positions of the anchor bolts are not uniform, they must be measured and marked individually. NOTE: If ½" anchor bolts are used, bore 3/4" holes in the sill plate to allow for sill plate alignment. NOTE: When sill plates are finally in place, nuts and washers should be put on and hand tightened only until the anchor bolts setting mortar has had sufficient time to harden.


SET BACK FOR SHEATHING
ANCHOR BOLTS LAYOUT MARKS
SILL PLATE
FRAMING SQUARE


1 FT. MAX
1 FT. MAX.
EMBEDDED, IF IN CONCRETE WALLS, 6" (METAL PLATE MAY BE OMITTED)
WOOD SILL
8 FT. MAX.
1 FT. MAX.
SILL
15" MIN
* AT LEAST TWO BOLTS SHALL BE PROVIDED IN EACH PIECE
2" WASHERS OR EQUIVALENT
FILL CORES OF BLOCK FOR ANCHOR

ANCHORING SILL TO MASONRY WALL

METHOD OF EVALUATION:

Accuracy of layout.

JOB: Set and Brace a Column

JOB SHEET IDENTIFICATION CODE

UNIT V: Floor Framing

JOB NUMBER: J-5-2

COURSE: Carpentry

MATERIAL:
(1) Pc 4 X 4 X 8' (Column)
(2) Pcs 2 X 4 X 1'-6" (Stakes)
(2) Pcs 1 X 4 X 10'-0" (Braces)
8d Box Nails
16d Common Nails

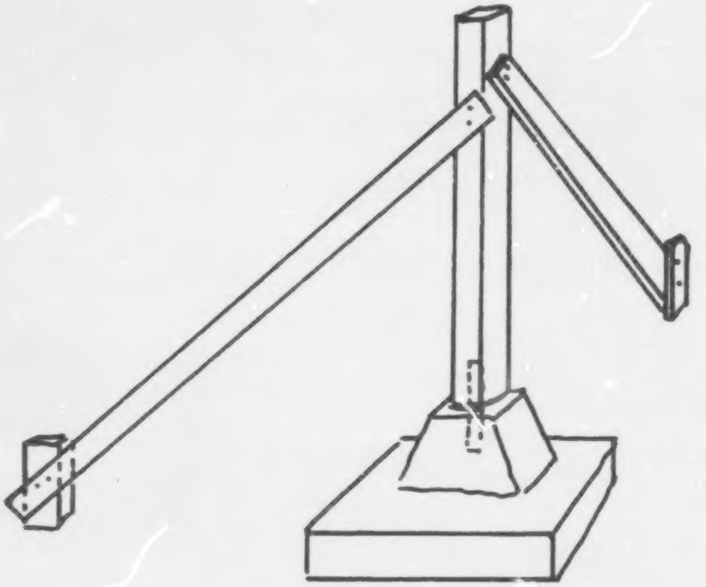
EQUIPMENT:
Stepladder
Sawhorses
Extension Cord

TOOLS:
Rule
Square
Hammer
Brace & Bits
Straight Edge
Carpenter's Level
Crosscut Handsaw

SAFETY PRECAUTIONS:

1. Follow safety precautions when using power saw and cord.
2. Use caution when moving about in excavations and rough terrain.
3. Be careful while working on stepladders.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out end of column and bore hole to receive dowel pin.	NOTE: Check the column footer to make sure it has been properly constructed and in the correct position.
2. Line up the hole in the bottom of the column with the dowel pin projecting from the top of the footer pedestal, and lower the column into position.	
3. Attach a temporary brace to the top of the column.	NOTE: When in this position, the column may be marked and cut to length. Some carpenters will make the column slightly long (about 3/8") to allow for settling of the footer. Remember to subtract for the thickness of the top bearing plate and depth of the girder.
4. With a carpenter's level, plumb the column and attach the lower end of the brace to a stake driven into the ground or to a block secured to the floor.	
5. Properly plumb and brace column both ways.	NOTE: Check to make sure that columns are in full contact with bearing surfaces at the bottom, that they are plumb and that the upper ends are cut square, so as to be in full contact with the girder.



METHOD OF EVALUATION:

1. Instructor will check column for plumb.
2. Installation of braces will be checked.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-3

JOB: Assemble Built-Up Wood Girder

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: 6 pieces - 2 X 8 X 16'

EQUIPMENT: Radial Saw
Portable Circular Saw

TOOLS: Hammer
Rule
Framing Square
Try Square or Combination Square
Steel Tape

SAFETY PRECAUTIONS:

1. Be careful when handling heavy materials. Lift with your legs, not your back.
2. Be careful when working around excavations.
3. Be careful when using hand and power tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select and cut girder members to length.	NOTE: All material should be "select structural" grade and each piece set with the "crown" edge up.
2. Place members in position on a flat surface such as the top of the foundation wall or a level floor area.	
3. Assemble pieces using 16d common nails. Follow the nailing pattern shown.	NOTE: All splices should be made over a supporting column, and they should be alternated as shown.
4. Continue to cut, place and nail members together. Keep the top edge of all pieces in careful alignment. Always begin nailing at one end of the piece and continue nailing as the pieces are lined up.	NOTE: Use a 20 ounce hammer for heavy nailing and avoid making unsightly hammer marks around the nail. Don't let these hammer tracks be your "trade mark".

METHOD OF EVALUATION:

1. Inspection of finished job
2. Alignment of members
3. Nailing

JOB: Set and Secure A Girder

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: Built-Up Girder from J-5-3

EQUIPMENT:
Sawhorses
Portable Saw
Stepladder
Extension Cord

TOOLS:
Framing Square
Hammer
Level

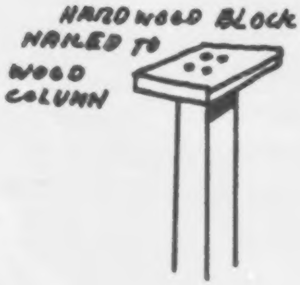
JOB SHEET
IDENTIFICATION CODE

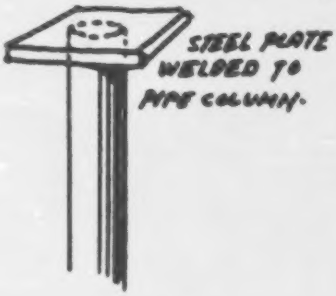
JOB NUMBER: J-5-4

SAFETY PRECAUTIONS:

1. Use care when using power tools and extension cords.
2. Be careful while working around excavations.
3. Be careful while handling and lifting materials.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set supporting posts or columns in place temporarily.	
2. Mark and cut columns to length.	NOTE: Girders may be set at different heights. This will be determined by the method used to frame the joist to the girder.
3. Attach column bearing plates.	
4. Set and brace columns.	
5. Set end bearing plates in girder pocket.	
6. Raise or slide girder into position with end resting on end bearing plates and bottom in contact with column bearing plate.	NOTE: The girder may be assembled on the floor and with sufficient help, raised into position. Some carpenters prefer to build a girder on a scaffold next to the row of columns and then roll the girder into position. Large steel girders may require a crain or other hoisting equipment for setting in place.





COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
7. Check the girder for alignment with a dry line or by sighting.	
8. Fasten the girder to the bearing plates.	

METHOD OF EVALUATION:

1. Check girder for:
    a. alignment
    b. height
    c. stability
2. Safe work habits on the job

JOB: Frame and Install Sill Plate

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: 2 X 6 Sill Plate Stock
Shingle Shims

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-5

EQUIPMENT:
Trestles
Portable Saw
Portable Electric Drill
Stepladder
Power Cord
3/4" Power Bit

TOOLS:
Framing Square
Hammer
Adjustable Wrench
Rule and Pencil
8 Point Saw

SAFETY PRECAUTIONS:

1. Use care when using power tools and extension cords.
2. Be careful while working around excavations.
3. Be careful while handling and lifting materials.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select and prepare sill plate stock.	
2. Lay out and bore holes for anchor bolts.	
3. Install plates and check with level and straightedge.	
4. Shim plates where necessary.	
5. Align and secure plates.	

METHOD OF EVALUATION:

1. Layout
2. Accuracy of dimensions
3. Quality of installation

JOB: Lay Out Regular Spacings for Floor Joist

UNIT V: Floor Joist

COURSE: Carpentry

MATERIAL: 1 piece 2 X 4 X 16

TOOLS: Framing Square

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-5-6

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

On one face of the 2 X 4, lay out spacings for floor joist located 16" O.C. using the following procedure:

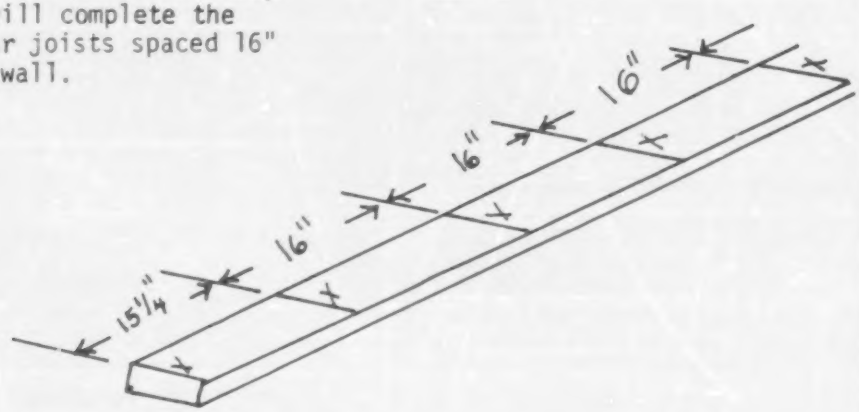
1. Beginning at one corner of the building, measure along the sill plate, where the joist will rest, and mark a distance of 15 1/4".

NOTE: This first mark 15 1/4" from the end will be at the side of joist No. 2, and measuring from this mark to lay off remaining 16" spaces will place these marks at the side of each joist instead of at their centers. Although the marks are at the side of each joist (16" side to side), the joist will be 16" center to center.

2. Place an X just beyond this mark.

3. Now from this mark, lay off 16" spaces until you reach the other end of the sill.

4. Place an X ahead of each mark and using a square, extend the mark across the top of the plate. This will complete the layout for all regular joists spaced 16" on center along this wall.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
	NOTE: In actual practice all layouts for floor joist will be started at the same end of the building. Layouts along a girder and along the opposite wall are similar to that on the first wall except that: A. On the girder the X's are placed on both sides of the mark. This is because the joist will overlap at the girder. B. On the opposite wall when joists are overlapped in the center of the building, the X's will be placed behind the mark instead of ahead as on the first wall.

METHOD OF EVALUATION:

Check accuracy of layout.

JOB: Lay Out Spacing for Floor Joists
UNIT V: Floor Framing
COURSE: Carpentry
MATERIAL: 1 Piece, 2 X 4 X 16 from J-5-5
TOOLS: Framing Square

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-7

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. On the edge of the 2 X 4, lay out the spacing for the floor joists as they would appear on top of the girder, Starting at the same end of the 2 X 4 as before.	
2. On the face of the 2 X 4 opposite your original layout, mark the location of the joists as they would appear on the sill plate on the opposite wall.	NOTE: When the layout is complete, there should be three identical layouts, beginning at one end of the building. The X's indicating the side of the mark where the joist will rest will be on one side of the marks for one joist span and on the other side for the other span. Since the center layout will have X's on both sides of the line, you must be careful to set the joist over the correct X at this point.

METHOD OF EVALUATION:

Accuracy of layout
Positioning of X's

JOB:	Lay Out on Sill Plate for Openings in Floor Framing	JOB SHEET IDENTIFICATION CODE
UNIT V:	Floor Framing	JOB NUMBER: J-5-8
COURSE:	Carpentry	
MATERIAL:	1 Piece - 2 X 4 X 16 from J-5-6	
TOOLS:	Framing Square Steel Tape Rule	

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check blueprints for size and location of opening.	
2. Measure and mark the center line of the opening if this dimension is given.	NOTE: Dimensions may be given to the center line of an opening or may be given to the sides of the opening. The size of the opening must also be shown.
3. From the center line, lay off one half of the opening to the right and one half to the left of the center line.	
4. If the dimension is given to the side of the opening, mark this distance on the sill plate.	
5. From this point, measure and mark the size of the opening.	
6. Square these marks across the top of the plate.	
7. Place an X on the outside of each line. This will locate the inside members of the double trimmers that form the sides of the opening.	NOTE: If these marks fall at or near the regular joist 16" on center, do not alter the regular joist, but slightly adjust the position of the trimmers (if permissable) to conform to the regular joist. If the trimmers fall between regular joist, then extra double joists will be required to serve as trimmers.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Since the trimmers are usually doubled, measure 1 1/2" from each side of the opening and mark a second square line across the plate. Again, place an X beyond each mark. This will locate the outside member of the double trimmer. This will complete the layout on the sill plate.	NOTE: If the opening is for a fireplace or flue (chimney), a 2" space is required around all sides. Thus, 4" should be added to the size of the opening.

METHOD OF EVALUATION:

1. Ability to interpret drawings
2. Layout accuracy

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-5-9

JOB: Frame Joist Header

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: As required for particular job assigned by instructor

TOOLS: Student will list necessary tools

SAFETY PRECAUTIONS:

Be careful when working on top of foundation walls.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut material to length, making splices, if necessary, on the ends of the joist. Avoid splicing over cellar windows.	NOTE: The joist header is required only on the ends of the joist. Study the blueprints and determine where headers will be used.
2. Set the header in place along the edge of the sill plate.	
3. Fasten with 8d or 10d nails driven at an angle.	NOTE: Just enough nails are used to hold the header in place and even with the edge of the plate.
4. When the headers have been cut and installed across one end, use the framing square to mark the joist spacings on the inside of the joist header. Square up from the layout lines on the sill plate.	. SC-5-1
5. After the floor joists are in place and fastened, toenail a 16d nail every 16" through the header into the sill.	

METHOD OF EVALUATION:

1. The instructor will check spacing of joists by measuring.
2. The instructor will check for squareness.

JOB: Set Floor Joist on Regular Spacing

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: As required for job assigned by instructor

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-5-10

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. After joists are cut to length, set them in place with the crowned edge up, and one end against the header joist.	
2. Place the joist over the X and exactly along the layout lines.	
3. Toenail two 8d nails on one side of the joist into the sill and one 10d nail in the other side.	. SC-5-1
4. Next, drive three 20d nails through the joist header into the end of each joist.	NOTE: Make sure the joist is tight against the inside of the joist header and on the layout lines, until it is fastened to the sill plate.
5. Now fasten the joist at the other end of the building in the same manner.	
6. If there are two sets of joists that overlap in the middle, make sure they are in their proper position. Fasten each to the sill plate or girder with two 10d nails toenailed from the side.	
7. Fasten the ends of the two joists that overlap each other by driving three or four 10d nails from each side into the lap.	

METHOD OF EVALUATION:

The instructor will check joist spacing by measuring.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-11

JOB: Straighten and Tie the Joists

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: 1 X 4's as needed for particular job assigned by the instructor

TOOLS: Hammer
Try Square

SAFETY PRECAUTIONS:

1. Be careful when climbing over framing members.
2. Do not walk on framing members that have not been secured to prevent tipping over.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay pieces of 1" x 4" or 1" x 6" across the joist near (but not at the center) of the floor.	
2. Nail the end of the first piece temporarily to the top of the first joist. Let nail heads project slightly for easy removal later, or use duplex nails.	NOTE: The temporary ties are left in place until the subfloor has been laid up to that point. Then they can be removed to continue the floor. The ties are placed to the side of the center line to permit installing cross bridging.
3. Next, have someone sight across the top of joist number two. Start a nail over the joist in the 1" X 4", and wnen the joist has been adjusted so that it appears to be as straight as possible, nail the 1" X 4" fast.	
4. Continue to straighten and fasten each joist until all are in alignment.	

ANOTHER METHOD WOULD BE TO:

1. Lay the 1 X 4 on top of the joists near the joist header.
2. Mark the position of each joist on the 1 X 4 by squaring a line across the top of the 1 X 4 and marking an "X" to indicate its position.
3. Move the 1 X 4 to a point near the center of the span. (A little beyond center would be better)
4. Fasten the 1 X 4 to the first joist.
5. Move each joist to bring it to the mark made in step #2.
6. Nail the 1 X 4 to the joist.

METHOD OF EVALUATION:

Instructor will sight along joists.

JOB: Frame Stairwell and Other Openings in Floor

JOB SHEET IDENTIFICATION CODE

UNIT V: Floor Framing

JOB NUMBER: J-5-12

COURSE: Carpentry

MATERIAL: 2 X 10 Floor Joist Stock
20d Common Nails

EQUIPMENT: Portable Power Saw
Extension Cord
Trestles

TOOLS: Hammer
8 Point Saw
Rule and Pencil
Framing Square

SAFETY PRECAUTIONS:

1. Use caution while working around or over open joists.
2. Handle long materials carefully and get help when lifting heavy item.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check dimensions and layout at sill plate and girder.	
2. Cut and install both inside trimmer joists.	
3. Layout trimmers to receive double headers at both ends of opening.	
4. Cut and install outside members of both double headers.	
5. Lay out headers to receive tail joists.	
6. Frame and install tail joists.	
7. Frame and install inside members of both double headers.	
8. Cut and install both outside members of double trimmers.	NOTE: Following the above procedure will permit spiking through one thickness of header into tail joists before headers are doubled and through one thickness of trimmer into headers before trimmers are doubled.

METHOD OF EVALUATION:

1. Layout
2. Accuracy of cuts
3. Alignment
4. Quality of finished work

JOB: Lay Out A Pattern for Wood Cross Bridging

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-13

UNIT V: Floor Framing

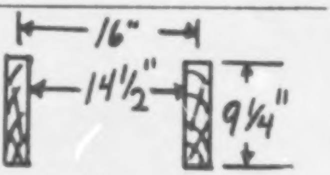
COURSE: Carpentry

MATERIAL: 1 Piece - 1 X 4 X 1'-6"

TOOLS: Framing Square

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

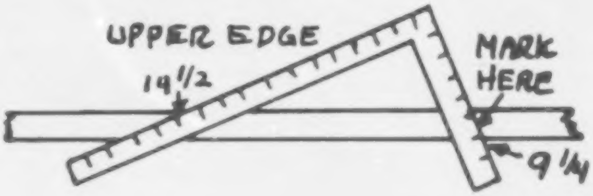
1. Determine the space between joists (16" less the thickness of a joist) and the height of the joist (2" x 10" will measure 9 1/4").



2. Use these two figures on the framing square (14 1/2" and 9 1/4") and apply the square to the edge of a piece of bridging stock as shown in sketch.

NOTE: The figures 9 1/4" and 14 1/4" are placed in opposite edges of the stock in both positions.

3. While in this position, mark along the tongue of the square (9 1/4") to lay off the angle at one end of the piece of bridging.

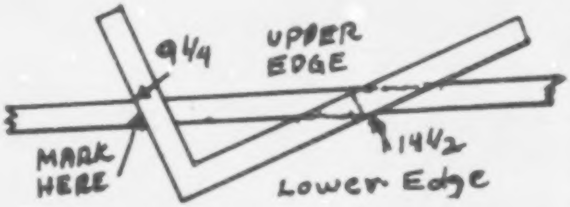


4. Now place the square in position #2.

5. Mark along the tongue of the square again to lay off the angle at the other end of the bridging, and at the same time, lay off the exact length of the bridging.

NOTE: In the second position, the figures and square are reversed and again are placed on opposite sides of the stock.

6. Square across the face of the stock at these marks and carefully cut the bridging at these layout lines to complete the pattern.



METHOD OF EVALUATION:

The instructor will inspect the finished product.

JOB: Cut Wood Cross Bridging with a Cutting Jig

JOB SHEET IDENTIFICATION CODE

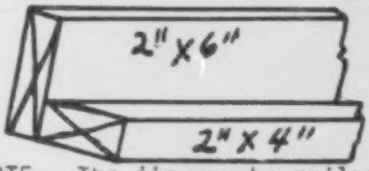
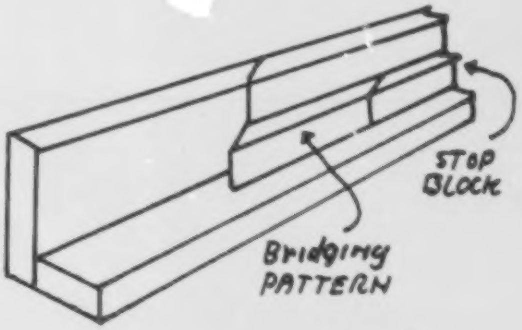
UNIT V: Floor Framing

JOB NUMBER: J-5-14

COURSE: Carpentry

MATERIAL:
1 Piece, 2 X 4 X 4'-0"
1 Piece, 2 X 6 X 4'-0"
1 Piece, 1 X 4 from J-5-13

TOOLS: Student will list tools required for the job

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Take a piece of 2" x 6" and a piece of 2" x 4" about 4' long each, nail them together with 10d common nails as shown in the sketch at right.	
2. Place the bridging pattern in the jig about 4" from the end, as shown in the drawing.	NOTE: The jig may be nailed to the top of a pair of saw horses to steady it while it is being used.
3. Make a stop block out of a piece of bridging stock about 4" long. Cut the bridging angle on one end of the block and nail it in the position shown.	
4. Place the bridging pattern against the stop block.	
5. At the other end of the bridging pattern, lay out the bridging angle cut on the back of the jig and across the top of the 2" x 6".	
6. With an 8 point hand saw, make a saw cut along these lines so it just passes by the end of the bridging pattern.	
7. Place a piece of bridging stock in the jig and make a cut on the end of the stock, Placing this cut end up against the stop block, saw the piece of bridging to length at the saw cut.	NOTE: It is a good practice, after the first several pieces of bridging have been made, to nail them in place to see if they are satisfactory.

METHOD OF EVALUATION:

The instructor will inspect the finished work.

JOB: Cut Wood Cross Bridging

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: 1 Piece, 1 X 4 X 6'-0"

EQUIPMENT: Radial Arm Saw

TOOLS: Framing Square
T-Bevel
Hammer

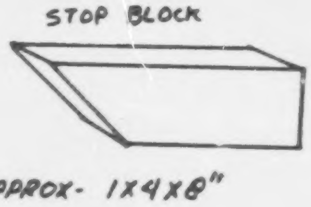
JOB SHEET IDENTIFICATION CODE

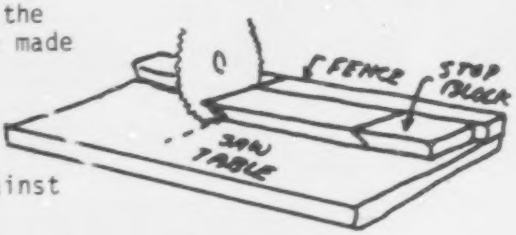
JOB NUMBER: J-5-15

SAFETY PRECAUTIONS:

1. Be careful when operating power tools to follow all safety rules.
2. Disconnect power tools and machines when setting them up.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Nearing one end of the 1X4, lay out of a pattern for cross bridging to be used between 2 x 10 joists spaced 16" O.C.	
2. Set up the radial arm saw to cut the bevel cuts on the ends of the bridging.	. SC-5-2
3. Cut a bevel on one end of a short piece of scrap to be used as a stop block.	
4. Cut the bevel on one end of the bridging.	
5. Move the bridging stock into position to cut the second end.	
6. Fasten the stop block to the table so the cut will be made along the layout line made in step #1.	
7. Cut the second end.	
8. Move the end of the bridging stock against the stop and cut the second piece.	
9. Continue cutting until all the stock has been used.	





METHOD OF EVALUATION:

1. Neatness of cuts
2. Accuracy of cuts

JOB: Install Cross Bridging

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-5-16

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: Bridging cut in J-5-12 and J-5-13
8d Box Nails

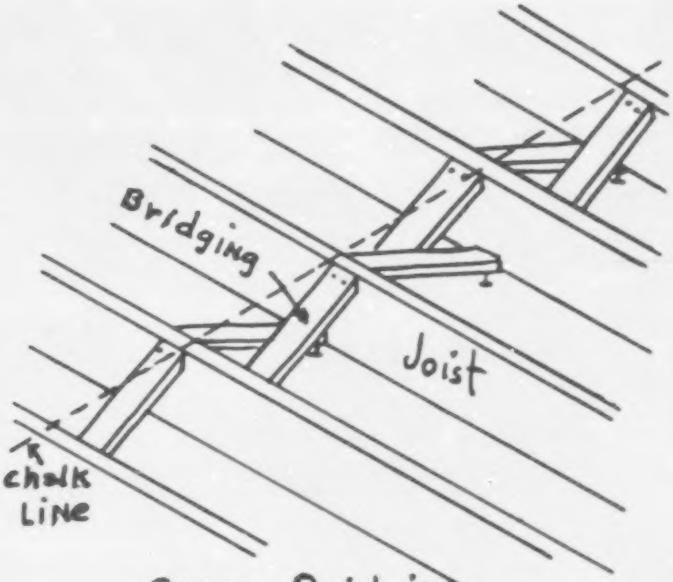
EQUIPMENT: Scaffolding

TOOLS: Chalkline
Hammer

SAFETY PRECAUTIONS:

1. Be careful when walking across open joist.
2. Make sure joists are tied to prevent tipping.
3. Watch out for others working below.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Find the center of the joist span at each end of the section to be bridged.
1. Snap a chalkline across the top of the joist from mark to mark.	NOTE: A 12" board or plank laid beside the chalkline will make it easier and safer to work.
2. Start four 8d box nails in a piece of bridging (two at each end).	NOTE: Start at one end and work to the other end, or start at the middle and work toward each end. Never start at each end and work to the middle.
3. Place the bridging in position on one side of the chalkline and even with the top of the joist, as shown in sketch.	
4. Fasten the upper end of the bridging at this time. Let the lower end of the bridging hang loose.	
5. Fasten all pieces of bridging in place (top only) with two ends up on one side of the chalkline and two ends down on the other side at each joist.	NOTE: Whenever an odd spacing between joists is encountered (less than 16" c-c), a piece of block bridging will have to be cut in.


Bridging
Joist
chalk Line

Cross Bridging

METHOD OF EVALUATION:

Instructor will inspect all installed bridging after step 6.

JOB SHEET IDENTIFICATION CODE

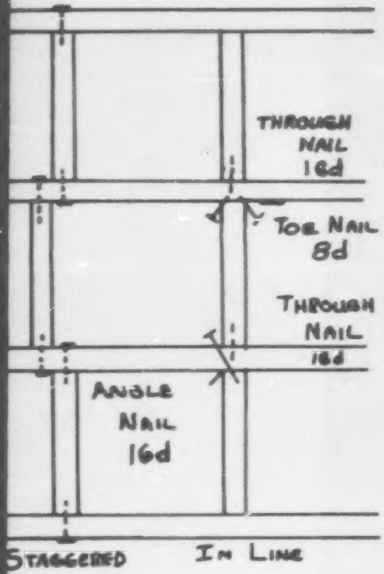
JOB NUMBER: J-5-17
DRAWING NO: D-5-17

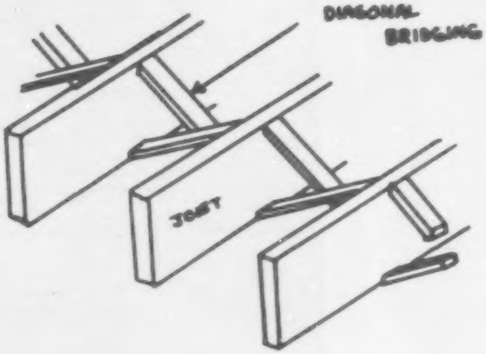
JOB: Cut and Install Solid Bridging
UNIT V: Floor Framing
COURSE: Carpentry
MATERIAL: 2 X 10 bridging material for job as assigned by the instructor
EQUIPMENT: Radial Saw
Scaffolding
TOOLS: Hammer
Chalkline

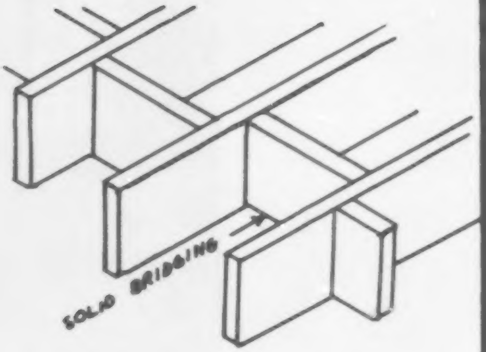
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Snap a chalkline across the top of the joist where the bridging is to be installed.	
2. Cut pieces of bridging to length. Check the distance between joists at both ends and use an average figure or measure where joists are fastened to determine length of bridging.	NOTE: Solid bridging is not recommended in the center of a joist span unless the joists can be made even across the tops first before the blocks are nailed fast.
3. Cut and fit each piece separately, nailing them as you go. Make sure that each piece is cut to the correct length - not too long and not too short.	

METHOD OF EVALUATION:

The instructor will inspect the finished product.


THROUGH NAIL 16d
TOE NAIL 8d
THROUGH NAIL 16d
ANGLE NAIL 16d
STAGGERED
IN LINE


DIAGONAL BRIDGING
JOIST


SOLID BRIDGING

Bridging	
	DRAWING NU D-5-17

JOB: Cut and Apply Diagonal Subfloor
UNIT V: Floor Framing
COURSE: Carpentry
MATERIAL: 1 X 6 Subfloor Material
8d Box Nails
EQUIPMENT: Portable Circular Saw
Extension Cord
Sawhorses
TOOLS: Student will list tools required to complete job

JOB SHEET
IDENTIFICATION CODE
JOB NUMBER: J-5-18
DRAWING NO: D-5-18 pp. 1 & 2

SAFETY PRECAUTIONS:

1. Be careful not to cut power cord with saw.
2. Make sure you do not cut into nails with hand or power saws.
3. Be careful with power cords around water or dampness.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place a mark 6' each way along the edge of the floor measured from the corner, where flooring is to be started.	NOTE: Floor joists should be straightened and stayed before subfloor is laid.
2. Snap a chalkline across the top of the joists joining these two marks.	
3. Cut a piece of subflooring to fit along this line and nail fast with two 8d nails at each joist and two at each end.	
4. Backlay subfloor to the corner.	
5. At the 6' starting point, continue to cut and lay the subfloor in the opposite direction until the entire floor is laid.	
6. If subflooring is matched (T & G), that is, tongue and grooved, cut splices square across the joist, as seen in Fig. 1. Otherwise, they should be cut on a 45° angle, as shown in Fig. 2.	NOTE: Some carpenters cut and fit each piece of flooring as they go. Others prefer to let the waste end hang out over the edge of the floor. After the floor is completely laid, the waste ends are all trimmed off at the same time.
7. Apply special furring strips in areas such as bathrooms and kitchens, where tile or linoleum floors are to be brought even with the finish floor in other rooms.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Snap chalklines along edges and around openings and trim off waste flooring with a protable power saw.	NOTE: At every seventh row, a space of 1/4" should be left between two boards. This is to permit the floor to swell, in case it gets wet during construction.

METHOD OF EVALUATION:

The instructor will inspect the finished product.

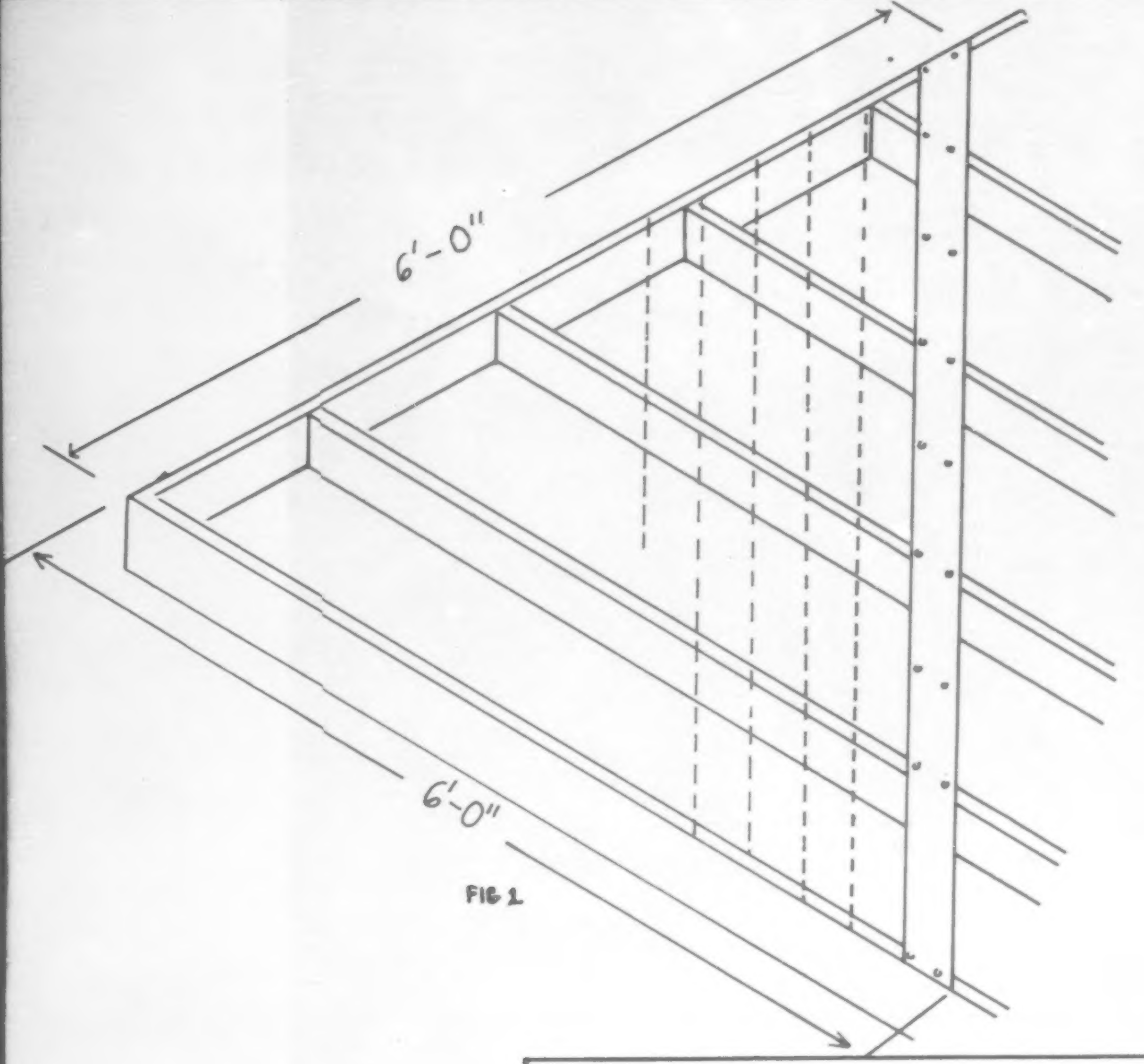


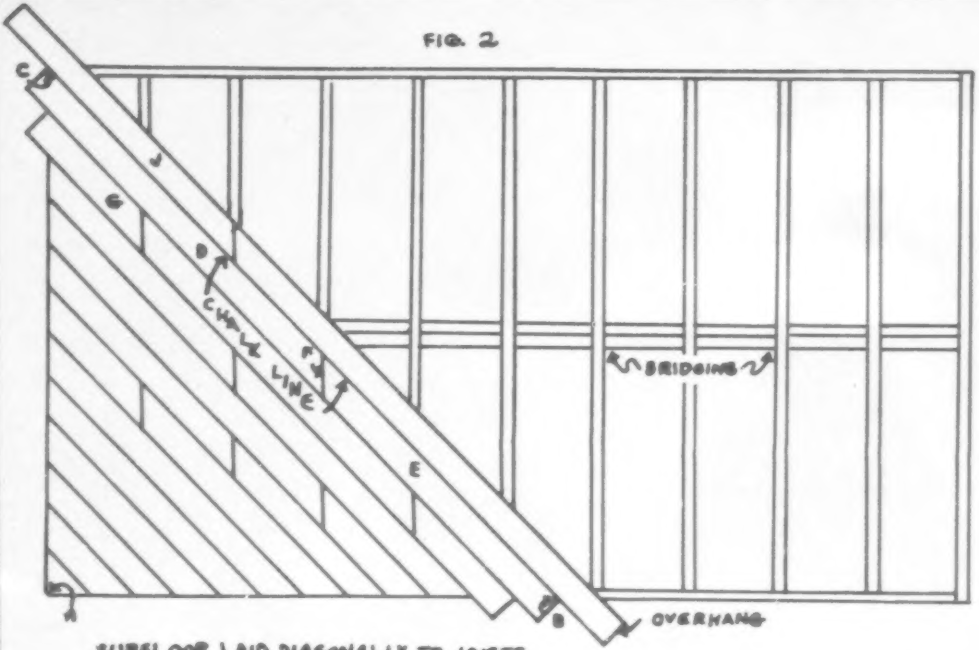
FIG 1

SUB-FLOORING

DRAWING NUMBER

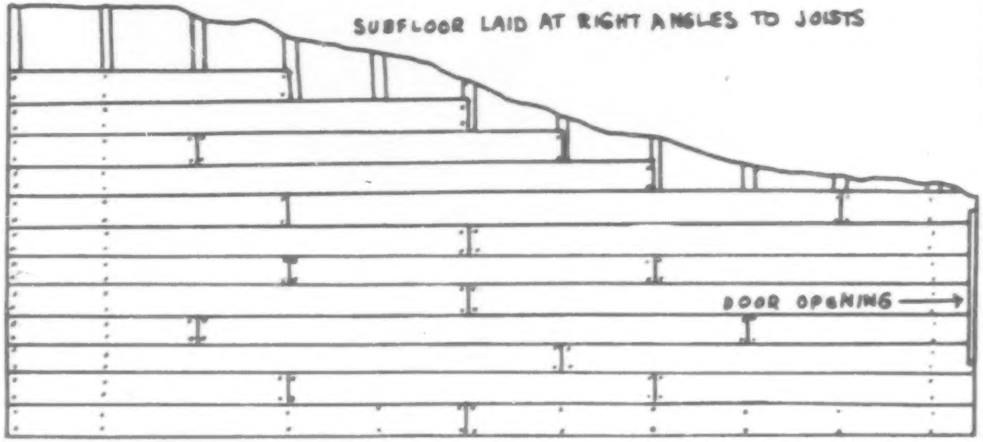
D-5-18, Pg. 1

FIG. 2


C
B
J
G
D
CHALK LINE
F
E
BRIDGING
A
B
B
OVERHANG

SUBFLOOR LAID DIAGONALLY TO JOISTS

FIG. 3


DOOR OPENING

SUBFLOOR LAID AT RIGHT ANGLES TO JOISTS

SUB-FLOORING

DRAWING NUMBER

D-5-18 Pg. 2

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-19

JOB: Cut and Apply Plywood Subfloor

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: 5/8" X 4" X 8' Plywood
Sheathing grade to complete job as assigned by instructor

EQUIPMENT: Portable Saw
Extension Cord
Sawhorses

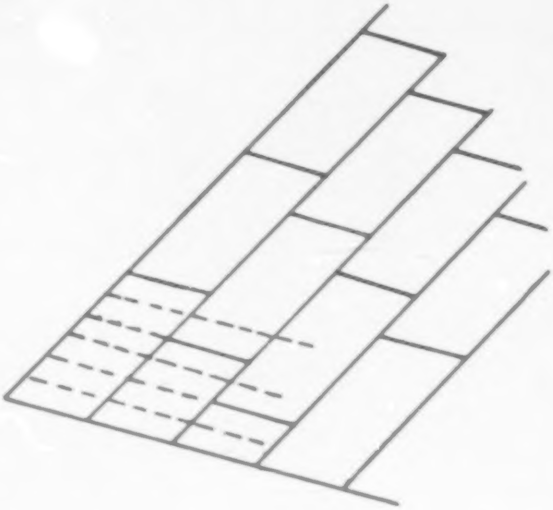
TOOLS: As needed

SAFETY PRECAUTIONS:

1. Be careful not to cut power cord with saw.
2. Make sure you do not cut into nails with hand and power saws.
3. Be careful with power cords around water or dampness.
4. Use special care when working around openings in floors, until safety railings are in place.
5. Always handle power tools with special care.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Lay a sheet of subfloor plywood along one edge of the floor and at right angles to the floor joist.
2. Carefully align the end of the sheet with the edge of the floor, and fasten every 4" with 6d coated box nails.
3. Align the long side of the sheet with the joist header, and fasten every 4", working from the corner out.
4. Check the spacing of the joist (16" c-c) at the opposite long side of the sheet and make sure that the end falls on the center of the joist. Drive a nail along the edge into each joist.
5. Continue to lay sheets of plywood in the same manner until the other side is reached. Measure or mark the last piece and cut it to length before nailing it in place.
6. Use the cutoff from the first row, if possible, to start the second row. Make sure all end joints are staggered or broken in successive rows.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
7. When several rows are in place and fastened around the edges, snap chalklines across the sheets at each joist and the remaining 6d coated box nails can be driven every 8" along the joist.	

METHOD OF EVALUATION:

1. Inspection of finished job for alignment, nailing and procedures used.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-20

JOB: Lay Out a Stair Carriage

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: 1 piece, 2 X 12 X 16'-0"

EQUIPMENT: Sawhorses

TOOLS: Framing Square
Square Gages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Select the stock and inspect to determine which is the crown edge of the piece. Place on saw horses with crown edge toward you.

2. Begin to lay out carriage at lower end and place square in position #1. Mark riser cut #1. (Fig. 1)

3. Place square in position #2 and mark cut on bottom of carriage.

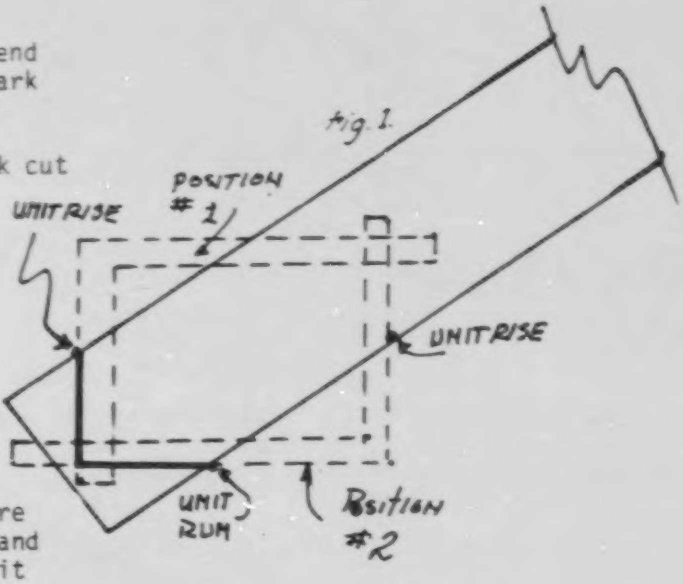


Fig. 1.
POSITION #1
UNIT RISE
UNIT RISE
UNIT RUN
Position #2

4. Place square clamps on framing square as shown in Fig. 2. Use the riser and tread cut figures (unit rise and unit tread).

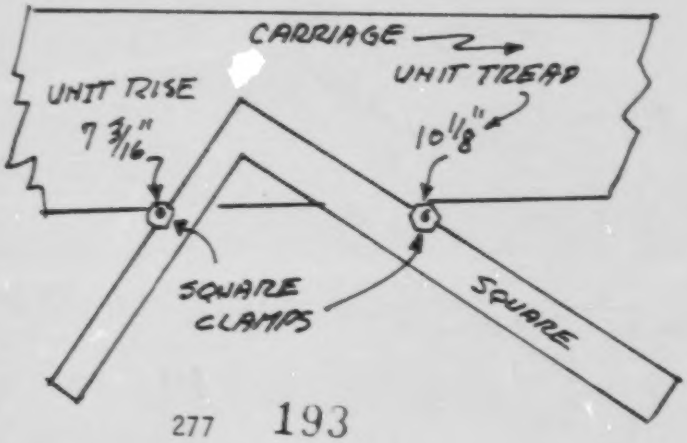


Fig. 2.
CARRIAGE
UNIT RISE
7 3/16"
UNIT TREAD
10 1/8"
SQUARE CLAMPS
SQUARE

5. Place square in position #3 and mark Riser cut #2 and tread cut #2.

6. Continue to place square, as in positions #4, #5, #6, etc. until 14 treads and 14 risers have been carefully laid out. Fig. 3

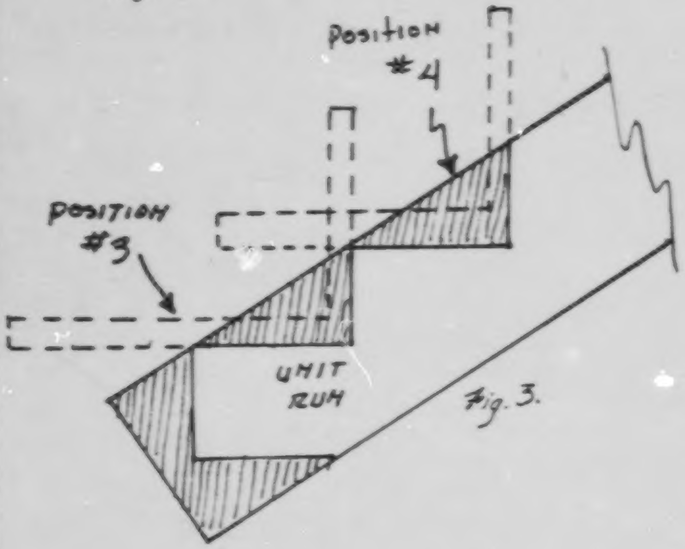
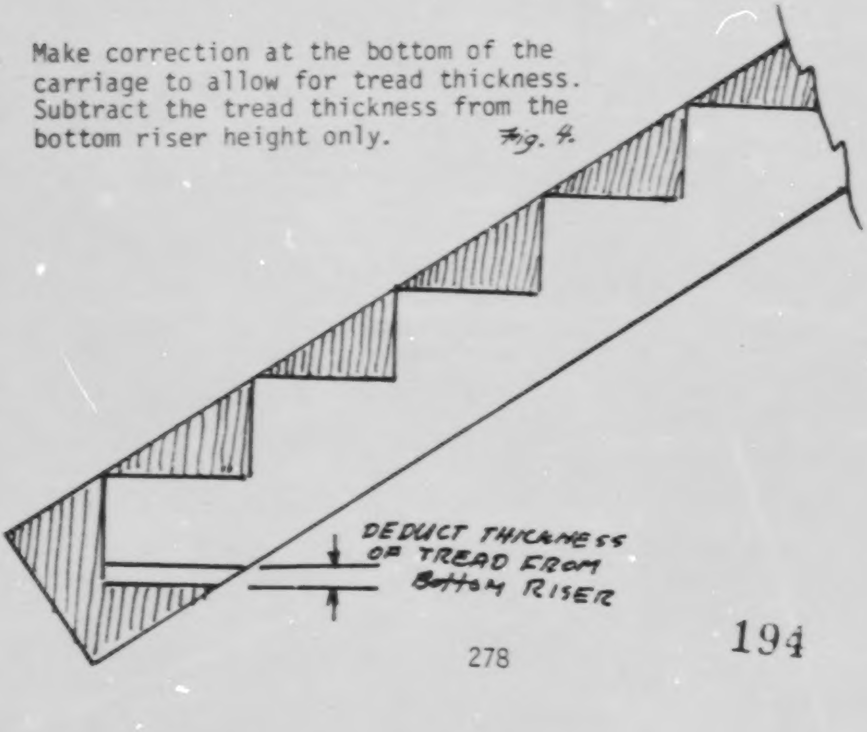


Fig. 3.

7. Make correction at the bottom of the carriage to allow for tread thickness. Subtract the tread thickness from the bottom riser height only. Fig. 4.



NOTE: Accuracy is important, as errors can be multiplied 14 times in laying off this many steps. Place square clamps accurately and keep a sharp pencil.

NOTE: Do not mark the 15th riser cut, as this will be the front of the floor construction. There is usually one more riser than there are treads in a stair. This is the one.

NOTE: Remember that the carriage has been lowered by the thickness of a tread, and therefore, the last tread cut at the upper end of the carriage, when in position, will be one riser height and one tread thickness below the finish floor level. When treads are in place, all steps will be equal in height.

8. Lay out upper end of carriage to fit against upper floor framing as shown in Fig. 5.

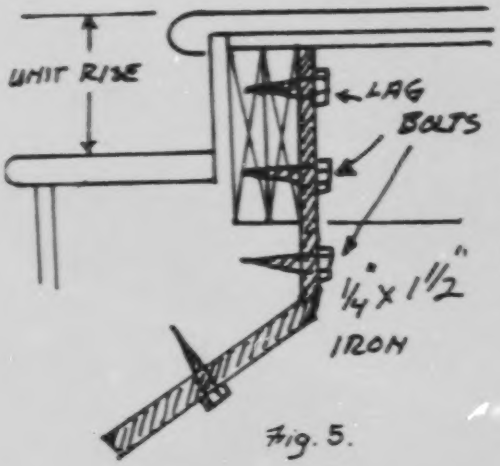

UNIT RISE
LAG
BOLTS
1/4" x 1 1/2"
IRON

Fig. 5.

NOTE: Check layout for accuracy and correct number of treads and risers.

METHOD OF EVALUATION:

Instructor will check layout.

JOB: Frame and Install Basement Stairway

JOB SHEET
IDENTIFICATION CODE

UNIT V: Floor Framing

JOB NUMBER: J-5-21

COURSE: Carpentry

MATERIAL:
- 2 X 12 Stock
- 1 X 8 Riser Stock
- Temporary Tread Stock
- 8d Casing Nails
- 10d Common Nails

EQUIPMENT:
- Portable Power Saw
- Trestles
- Extension Cord
- Stepladder

TOOLS:
- 8 Point Hand Saw
- Framing Square
- Square Clamps
- Nail Set
- Rule and Pencil
- Hammer

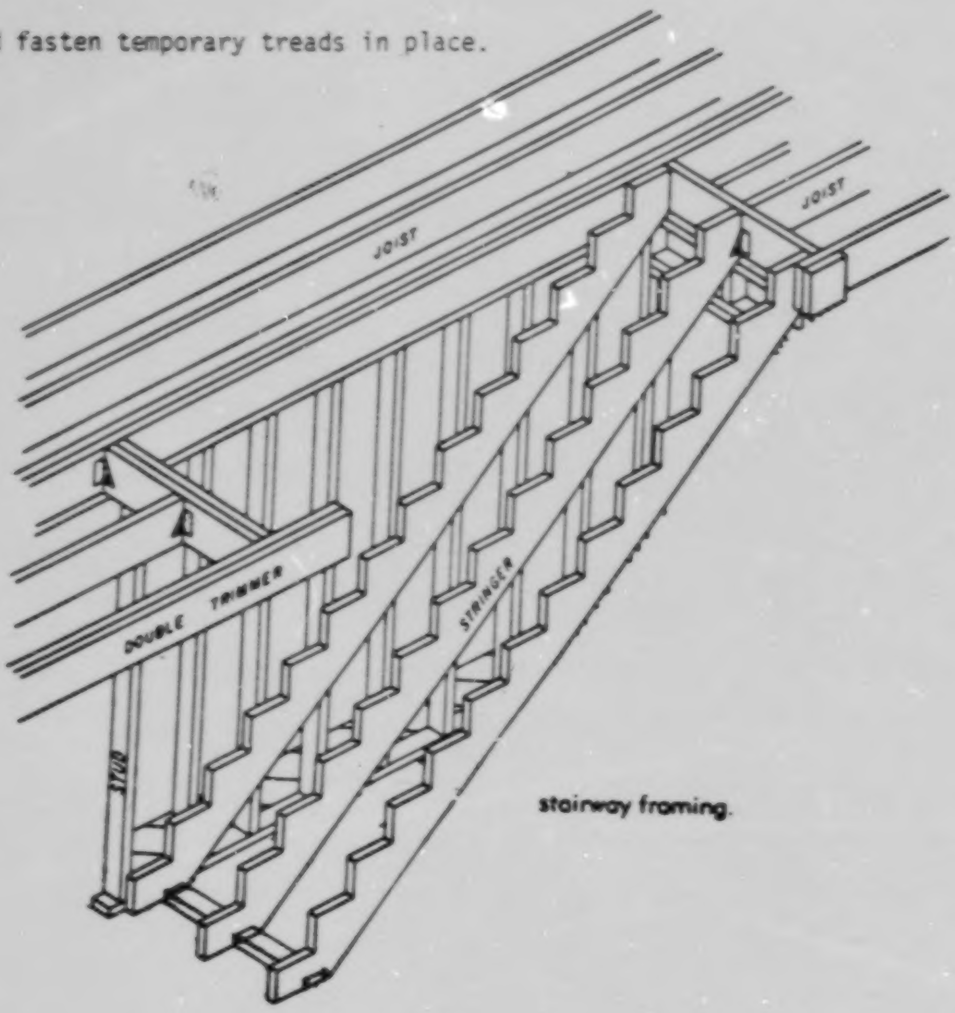
SAFETY PRECAUTIONS:

1. Use special care when working around openings in floors, until safety railings are in place.
2. Always handle power tools with special care.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check drawings for dimensions.	
2. Determine unit tread and unit rise cuts and the number of treads and risers required.	
3. Lay out stair carriage.	
4. Make necessary adjustments for tread thickness and layout for proper framing at upper end.	NOTE: Make sure crown side of stock is up.
5. Cut out stair carriage.	
6. With carriage No. 1 as a pattern, mark carriage No. 2 and No. 3.	
7. Cut out second and third carriage.	
8. Set carriages in position, align, level and fasten in place.	
9. Install special nailers or sub-risers where required.	
10. Fit and install finish riser boards.	

7

11. Cut and fasten temporary treads in place.

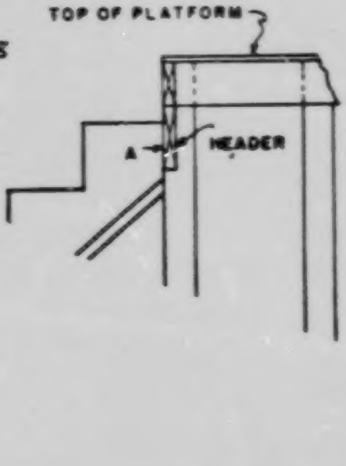

JOIST
JOIST
DOUBLE TRIMMER
STRINGER

stairway framing.

METHOD OF EVALUATION

1. Layout
2. Accuracy
3. Quality of finished product
4. Alignment

Alternate Framing At Header


TOP OF PLATFORM
A
HEADER

JOB: Install Safety Railing

JOB SHEET
IDENTIFICATION CODE

UNIT V: Floor Framing

JOB NUMBER: J-5 22

COURSE: Carpentry

MATERIAL:
2 X 4 Stock
1 X 6 Stock
16d Common Nails
8d Common Nails

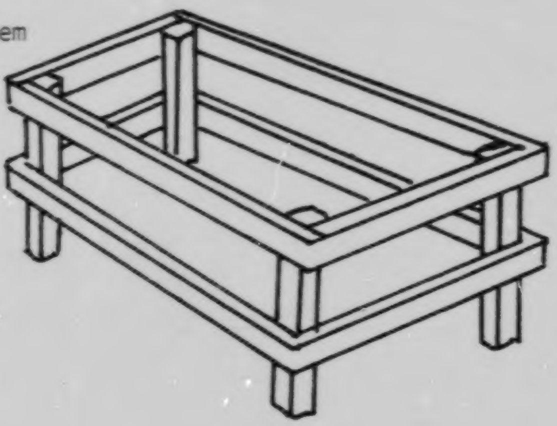
EQUIPMENT:
Portable Power Saw
Trestles
Extension Cord

TOOLS:
Hammer
8 Point Saw
Rule and Pencil
Carpenter's 28" Level

SAFETY PRECAUTIONS:

1. Follow all safety rules pertaining to power tools.
2. Work carefully around openings in floors and outside edges of floor.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare 2 x 4 corner and intermediate uprights.	
2. Plumb uprights and fasten them securely.	
3. Cut top railing members and fasten them in place.	
4. Cut and apply intermediate railing members.	
5. Apply bracing where lateral support is necessary.	
6. Check railing to make sure it is properly nailed and quite sturdy.	



METHOD OF EVALUATION

1. Dimensions
2. Accuracy of cuts
3. Accuracy of installation
4. Strength of installation

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-5-23

JOB: Floor Framing

UNIT V: Floor Framing

COURSE: Carpentry

MATERIAL: Student will list equipment, tools and materials needed to complete the job assigned by the instructor.

SAFETY PRECAUTIONS:

1. Follow all safety rules.
2. Be safety conscious at all times.
3. Think safety.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check foundation for accuracy and alignment.	
2. Lay out and prepare columns.	
3. Set and brace columns.	. J-5-1
4. Lay out, cut and assemble built up girder.	. J-5-2
5. Set and secure girder.	. J-5-3
6. Install sill plate.	. J-5-5, J-5-4
7. Lay out joist spacing on top of sill plates and girder.	. J-5-6
8. Frame and install joist header.	J-5-9
9. Transfer layout marks to joist header.	
10. Lay out and cut floor joist.	
11. Install regular floor joist.	. J-5-10
12. Lay out and frame openings in floor.	. J-5-12
13. Lay out, cut and install cross bridging.	. J-5-14 to J-5-16
14. Install solid bridging between joist spaced less than 16" O.C.	. J-5-17
15. Lay subfloor.	. J-5-19

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
16. Frame and install basement stairs.	. J-5-21
17. Install safety railings.	. J-5-22

METHOD OF EVALUATION:

This job will be used as a performance test for Unit 5 (floor framing).

JOB: Lay Out Sole and Top Plates for Regular Spacing

JOB SHEET IDENTIFICATION CODE

UNIT VI: Wall Framing

JOB NUMBER: J-6-1

COURSE: Carpentry

MATERIAL: (2) Pcs 2 X 4 X 12

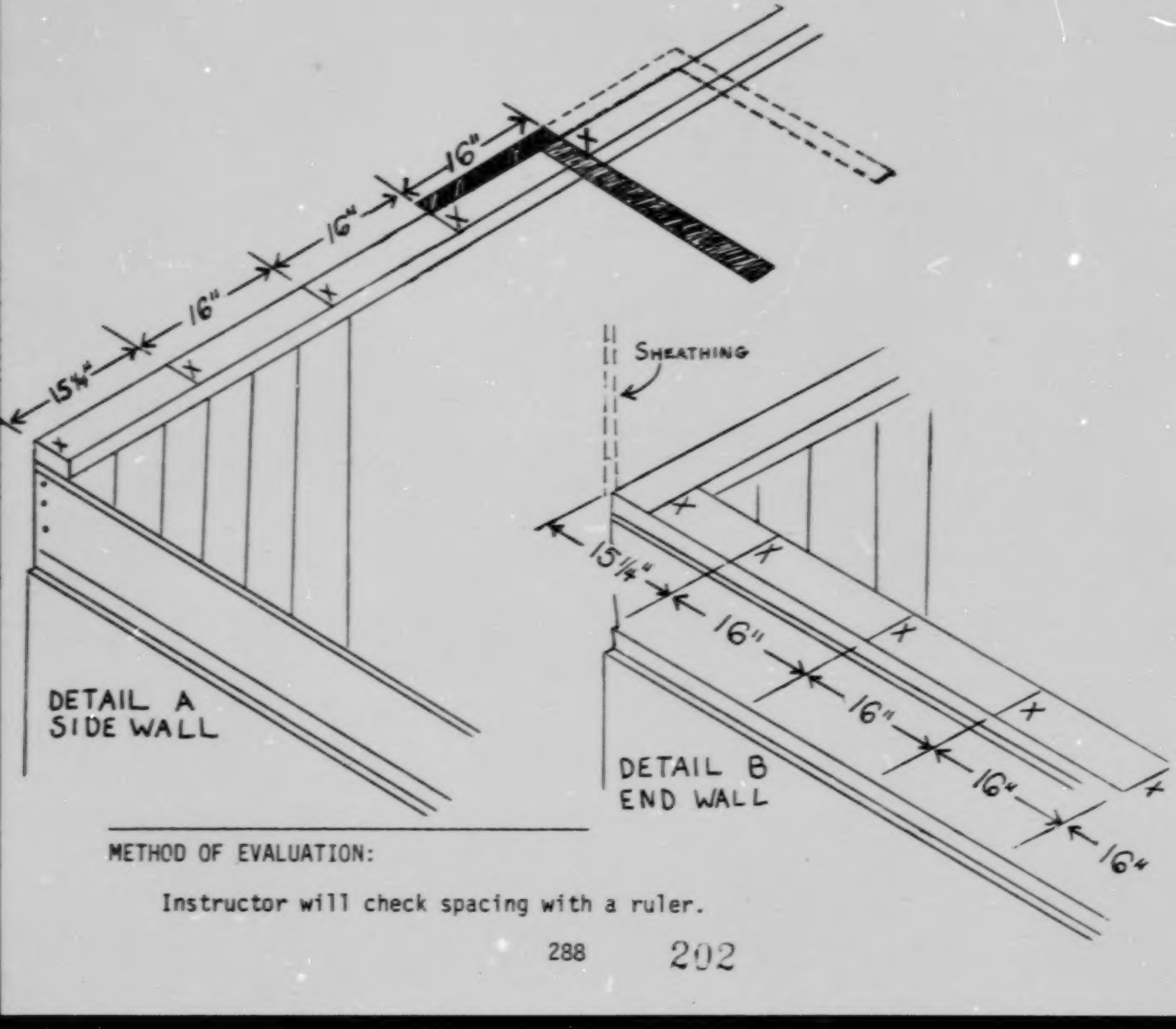
TOOLS: 100' Steel Tape
Combination Square

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
Use the framing square to lay out spacing on the sole plate to be used for the side wall (Detail A). Studs to be 16" O.C.	
1. Measure from the very end of the sole plate for sidewall #1 and place a mark at 15 1/4". With the framing square, draw a square line across the plate at this mark and place an X just ahead of this mark.	
2. Mark the remaining 16" spaces (as shown in sketch) with the 16" tongue of the framing square and a sharp pencil.	NOTE: For greater accuracy on long walls, use a steel measuring tape with 16" spaces identified with arrows.
Use the 100' steel tape and a combination square to lay out spacing on the sole plate to be used for the side wall (Detail B). Studs to be 16" O.C.	
3. Drive a nail at the 15 1/4" mark so that when the ring of the steel measuring tape is hooked over the nail, the end of the ring will be exactly on the line.	NOTE: The first 15 1/4" space for the end wall begins at the face of the sidewall sheathing, as seen here.
4. As the steel tape is unrolled along the sole plate, place a pencil mark at each 16" space (16", 32", 48", etc.) until the other end of the plate is reached.	

5. With the framing square or a combination square, mark a square line across the plate at each 16" mark, placing an X ahead of each line, as in detail B. This completes the layout for regular studs 16" c-c.

6. Lay out the corresponding top plate or partition cap, cut the plate to length and place it beside the stud shoe or sole. Then, with a square, transfer all lines across to the plate, including the X's.

NOTE: Partition soles and caps are laid out much like all shoes and plates. The important thing is to make sure you start to measure at the correct place and make the first space 15 1/4".


15¼"
16"
16"
16"
X
X
X
X
X
X
DETAIL A
SIDE WALL
SHEATHING
15¼"
16"
16"
16"
16"
X
X
X
X
X
DETAIL B
END WALL

METHOD OF EVALUATION:

Instructor will check spacing with a ruler.

JOB: Lay Out For Openings and Partitions in Wall Frames

JOB SHEET IDENTIFICATION CODE

UNIT VI: Wall Framing

JOB NUMBER: J-6-2

COURSE: Carpentry

MATERIAL: 1 Piece 2 X 4 X 16'

TOOLS:
Framing Square
Rule
Try Square

SAFETY PRECAUTIONS:

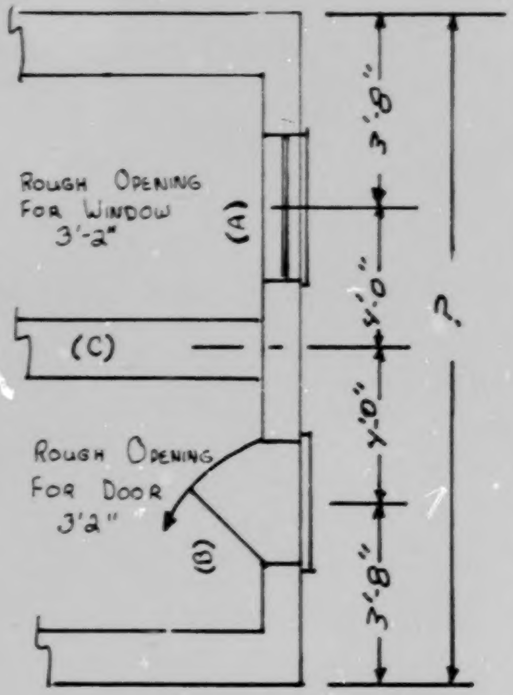
Be careful when handling materials.

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Add all the dimensions to find the length of the plate.
2. Lay out regular spacing for studs 16" O.C.
3. Use the following procedure to lay out on one face on the 2 X 4:
   - a. opening for window (A)
   - b. opening for door (B)
   - c. partition (C)
4. Check drawings for correct dimensions.
5. Measure from the corner or from a previous centerline, as indicated on the blueprints, and mark the center line of the opening on the sole plate. Use this symbol to identify the center (C_L). See Fig. 1.
6. Determine the rough opening dimension (RO, as shown in door or window schedule) and from the center line, measure to the right and to the left 1/2 of the RO dimension. Fig. 1.
7. With the square, draw a line across the sole plate at both of these marks.

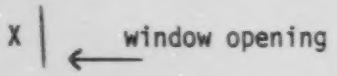
TEACHING/LEARNING ACTIVITIES

NOTE: Dimensions on drawings are usually to center lines of openings, except for openings in masonry walls, which may be given to the sides of opening, when the width of the opening is given also.



8. Place an X just beyond each line and inside the opening near each line place this mark of identification, as seen in Fig. 1.

NOTE: All full length studs will be omitted in the opening when the wall is being framed.


X
window opening

9. Now measure 1-1/2" from the line on each side of the opening and place a second line and an X just beyond, to indicate double studs at each side of the opening. See Fig. 1.

10. Measure from the corner and mark the location of the partition centerline.

NOTE: After the stud shoe has been completely laid out, the top plate is cut and laid beside the stud shoe and all of the layout lines and X's are transferred across with a square.

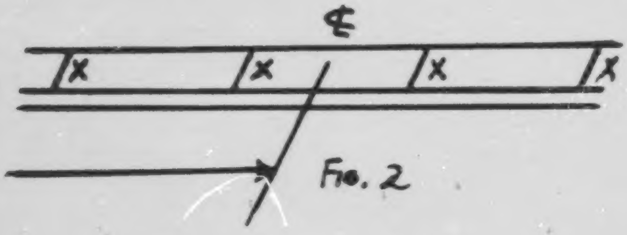


Fig. 2

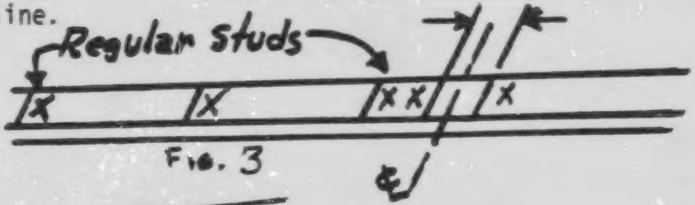

Regular Studs
X
X
X X
X
℄

Fig. 3

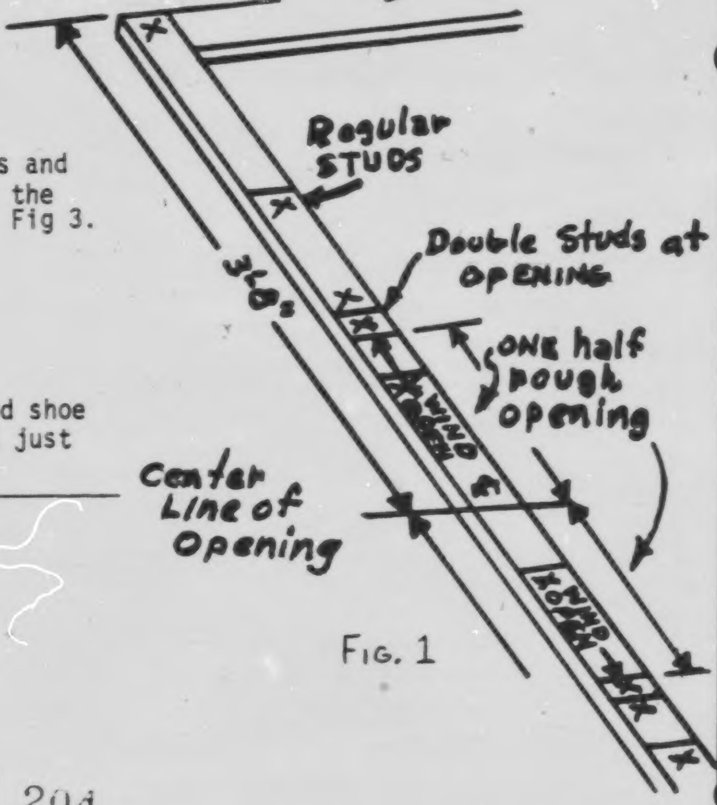

X
Regular STUDS
X
3-0s
Double Studs at OPENING
X
X X
ONE half rough opening
WIND ROUGH
℄
Center Line of Opening
WIND ROUGH
X X
X

Fig. 1

11. From the centerline, lay out marks and to the left one-half the width of the partition (3 1/2" ÷ 2" = 1 3/4"). Fig 3.

12. Draw a square line across the stud shoe at these two marks and place an X just beyond each line. Fig. 3

METHOD OF EVALUATION:

The instructor will check layout dimensions against the drawings.

JOB: Make A Master Stud

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: 1 Piece 2 X 4 X 8'-0"

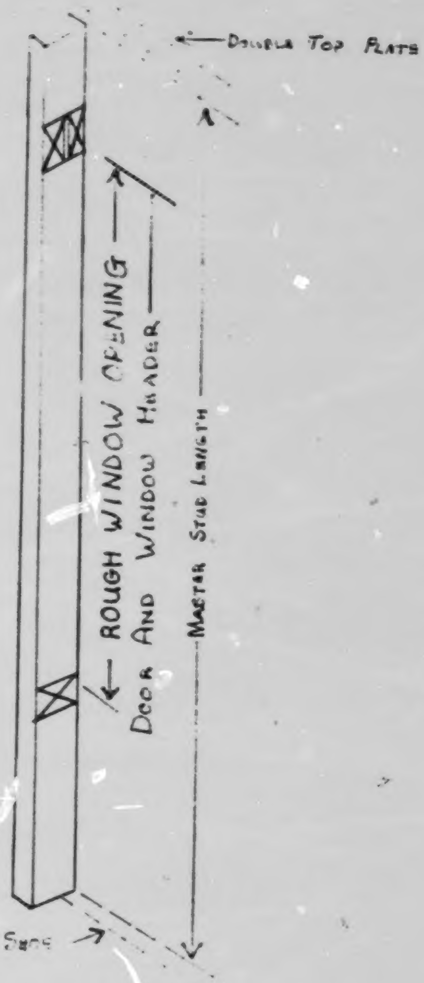
TOOLS: Student will list tools required to complete the job.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-3

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select a straight piece of 2" x 4" stock 8' long if a platform type frame is being built (16' long if balloon frame).	
2. Measure off the exact length of the wall studs.	NOTE: The length of the wall studs is determined by consulting the blueprints to determine the exact height of the outside wall frame (distance from top of subfloor to underside of ceiling joists). From this dimension, subtract three thickness of 2" x 4" (stud shoe and double top plate). This will be the actual length of the stud.
3. Mark square lines across the 2" x 4" at this point and cut off as square as possible.	
4. Determine the height of the door and window rough opening (distance from subfloor to underside of door header) and subtract one thickness of 2" x 4".	
5. Measure the distance off on the master stud from the bottom and square a line across at this point.	
6. Indicate the double header above this line as required.	

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
7. Determine the rough window opening height and measure down from the underside of the header and mark this distance on the master stud.	NOTE: The length of the wall studs, the position of sill and header and the length of cripple studs above or below the openings can be taken from the master stud pattern.
8. Square a line across at this point and indicate the rough window sill below this line (usually one thickness of 2" x 4").	


DOUBLE TOP PLATE
ROUGH WINDOW OPENING
DOOR AND WINDOW HEADER
MASTER STUD LENGTH
STUD SOLE

METHOD OF EVALUATION:

Instructor will check the accuracy of the master stud with a ruler and square.

JOB: Make and Use A Cut-Off Box or Jig

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: Student will list material needed

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-4

SAFETY PRECAUTIONS:

1. Be careful when using hand and power tools.
2. Follow all safety procedures.

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

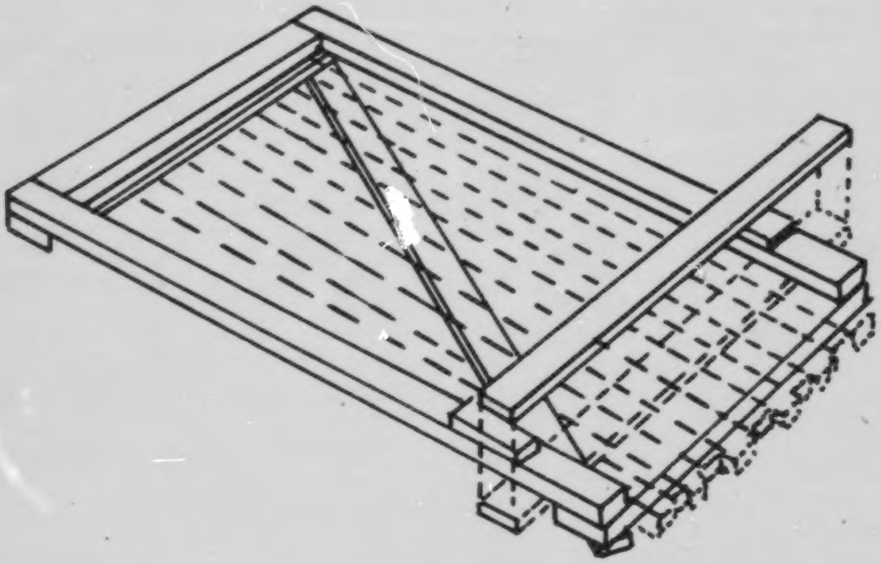
1. Select straight stock for all pieces. Cut a piece of 2" X 4" and a piece of 2" X 6" to length for the end of the frame.
2. Select two straight pieces of 2 X 4 X 8'-0" for the sides of the frame.
3. Assemble the frame as shown in drawing, using 10d common nails.
4. Apply a diagonal brace or two to the underside of the frame if it is to be attached to saw horses.
5. Cut two 1 X 4 X 12" blocks and a 1" X 6" straight edge 4' long.
6. Nail the 1" X 4" blocks on the side members of the frame as shown. Their position is determined by the power saw held at the very end of the master stud pattern with the 1" X 6" straight edge against the base of the power saw and the blocks against the straight edge, as shown.
7. Since the two blocks are equal distance from the stop piece, hold the straight edge square across the frame.

TEACHING/LEARNING ACTIVITIES

NOTE: The jig shown can, when finished, be placed on a pair of saw horses. However, a larger jig can be made and attached to the subfloor simply by making longer cross pieces and omitting the diagonal bracing. The frame is then squared and secured to the subfloor.

A cutting box for studs is similar to the cutting box for bridging, only on a larger scale. However, only one stud at a time can be cut.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Lay the 1" X 6" straight edge across the frame and against the blocks after the 2" X 4" studs have been placed into the frame to be cut to length.	NOTE: 2" x 4"'s placed in the frame should be reasonably straight, or they are not suitable for studs. Tapers or wedges can be carefully driven in between the last 2" X 4" to be cut and the side member of the frame. The wedges will straighten slightly crooked studs and hold them all steady while being cut. Be sure all studs are tight against the stop block.
9. Hold the power saw against the straightedge and pass it over the 2" X 4" 's to be cut.	



METHOD OF EVALUATION:

Instructor will check the final product with a square and ruler.

JOB: Construct an Outside Corner Post

UNIT VI: Wall Framing

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-5

MATERIAL:
3 Pieces, 2 X 4 X 8'-0"
3 Pieces, 2 X 4 X 1'-0", Blocking
10d Common Nails
16d Common Nails
1 Piece, Plywood, 1/2" X 2" X 8'-0"

TOOLS:
Square
Hammer
8 Point Crosscut Handsaw

SAFETY PRECAUTIONS:

Remove all nails from material that has been torn apart.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select three straight 2" X 4" 's cut to stud length.	
2. Cut three blocks of 2" X 4" about 12" long (without large knots).	
3. Fasten the three 2" X 4" blocks to one of the straight 2" X 4" 's, as shown at right, one each end and one in the middle. Make sure the blocks are flush at both ends and sides. Use 10d common nails. See Fig. 1.	

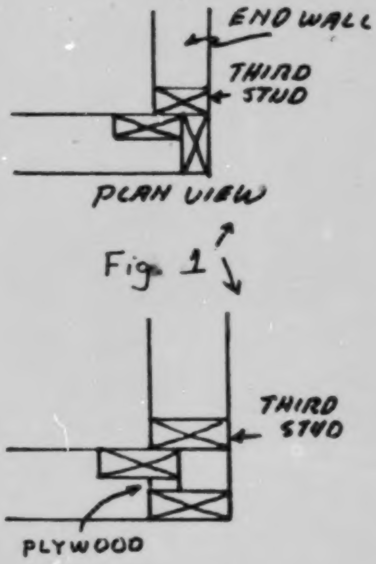
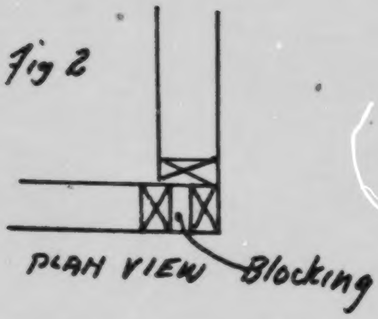
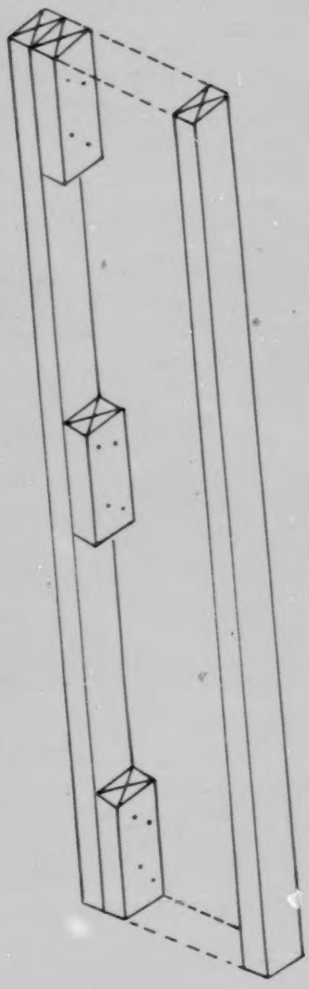


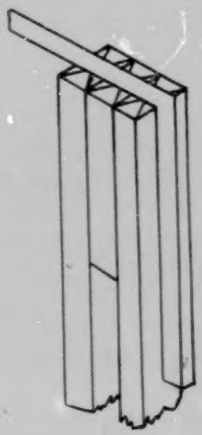
Fig. 1

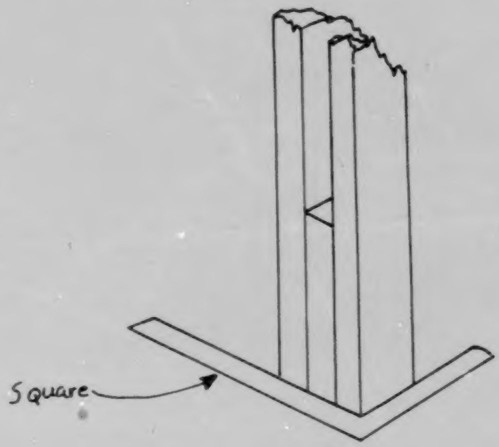
Fig 2



COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
4. Fasten the second 2" X 4" to the blocks with 10d nails, keeping ends and sides flush.	NOTE: Check both ends and sides with a square to make sure that the corner post is square.
5. Set the corner post into position in the side wall frame.	
6. Using the third 2" x 4" set as the first or last stud in the end wall frame, raise it with the end wall and then line it up with and fastened to the corner post. (See sketches below.)	NOTE: Have your work checked.







7. Disassemble the members and remove all nails.

8. Construct the type of corner post shown in Fig. 3.

NOTE: As with the other type of corner post the third stud may be framed with the end wall and nailed to the other studs after it is raised.

9. Disassemble the members and remove the nails.

10. Use the same materials plus the piece of plywood to construct the type of corner post shown in Fig. 4.

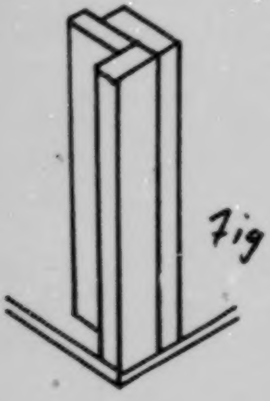


Fig 3.

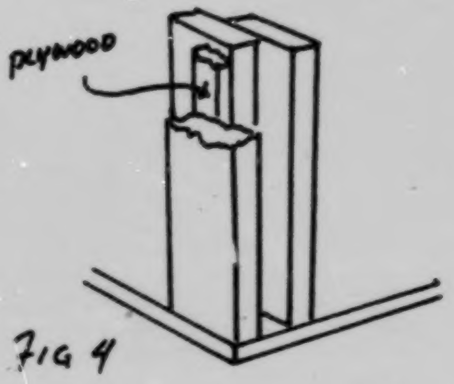


Fig 4

METHOD OF EVALUATION:

Instructor will look over the finished post.

JOB: Construct A Partition Post (T-Post or Take-Off Post)

JOB SHEET IDENTIFICATION CODE

UNIT VI: Wall Framing

JOB NUMBER: J-6-6

COURSE: Carpentry

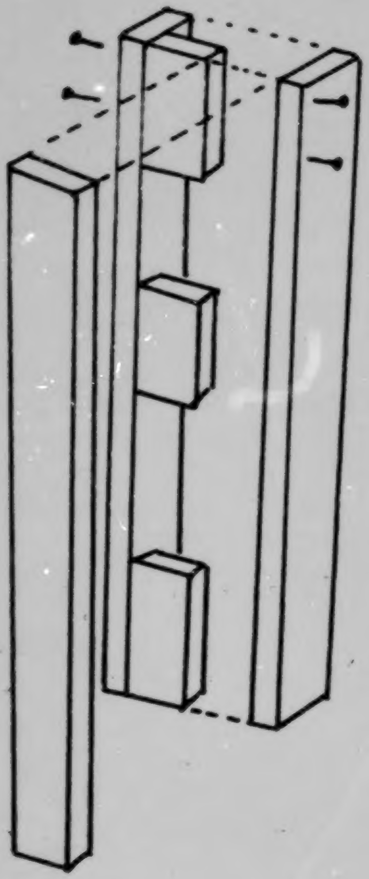
MATERIAL:
- 3 Pieces, 2 X 4 X 8'-0"
- 3 Pieces, 2 X 4 X 1'-0", Blocking
- 10d Common Nails
- 16d Common Nails

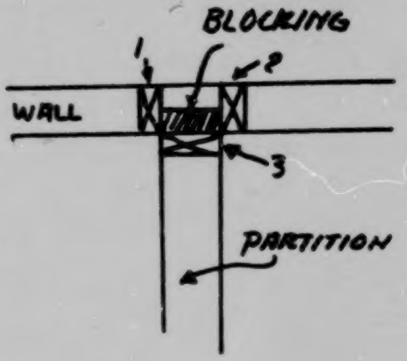
TOOLS:
- Square
- Hammer

SAFETY PRECAUTIONS:

Remove all nails from material that has been torn apart.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Disassemble the corner post made in J-6-5.	NOTE: 2 X 4 blocking to be placed at top, bottom and center of studs.
2. Nail the blocking to one of the studs. (Keep edge of stud even with face of blocking).	
3. Nail the second stud to the other edge of the blocking.	
4. Nail the third stud to the face of the blocking.	NOTE: The third stud may be framed and raised with the partition and nailed to the post after it is raised.




BLOCKING
1
2
WALL
3
PARTITION

METHOD OF EVALUATION:

1. Proper nailing technique
2. Accurate construction

JOB: Assemble Exterior Wall Sections

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: Material, equipment and tools to be listed by the student to complete the job as assigned by the instructor.

JOB SHEET IDENTIFICATION CODE

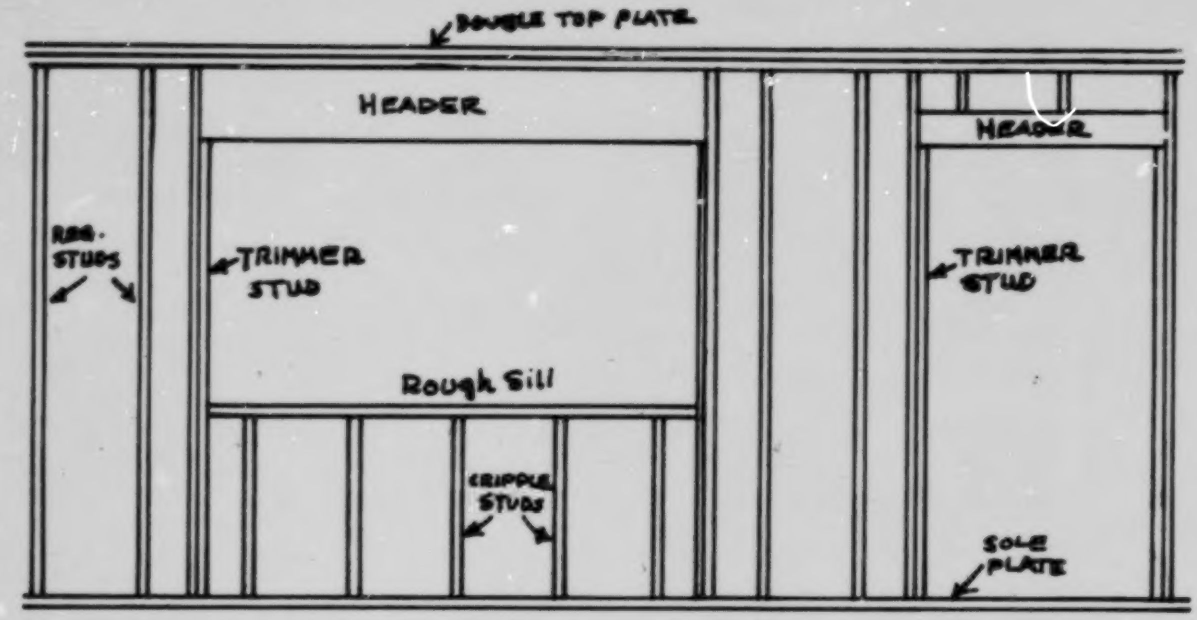
JOB NUMBER: J-6-7

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place the sole plate on the floor platform on its edge, with the layout lines facing in.	
2. Place the wall plate on the floor opposite the stud shoe, with layout lines facing the shoe.	NOTE: Omit all of the full length studs within the openings. Select only straight studs for the double trimmers and set the outside member only at this time.
3. Place the stud on the floor (one at every 16" spacing), separating the shoe and plate.	
4. Fasten the sole plate to the bottom end of the studs with two 16d common nails driven through the plate into the ends of each stud.	NOTE: Each stud should be held exactly on its layout line and flush with the upper edge of the shoe.
5. Fasten the top plate to the upper ends of the studs in a similar manner.	
6. Cut the jack studs to length and fasten in place with 10d nails.	
7. Cut double headers to length and fasten them together with 1/2" spacers between.	NOTE: Make sure all framing members are kept exactly flush with the upper side which will be the outside when the wall is raised.
8. Set the headers in place on the top of the jack studs and fasten them with 16d common nails.	
9. Cut the rough window sills to length and place them beside the stud shoe at the bottom of the opening and transfer the regular stud layout to the rough sill.	NOTE: If partition posts are being used, they may be installed either before or after the wall is raised.

10. Fasten the rough sill in place toe nailing to the jack studs with 8d nails.

11. Cut cripple studs to length and set under the ends of the rough sill until the toenailing is finished; then the cripple studs can be moved to their layout lines and fastened with toenails at the bottom, and 16d nails at the top.

NOTE: Check to make sure that each framing member is kept flush on the upper (outside) side, exactly on the line and properly nailed.


DOUBLE TOP PLATE
HEADER
HEADER
REG. STUDS
TRIMMER STUD
TRIMMER STUD
Rough Sill
CRIPPLE STUDS
SOLE PLATE

METHOD OF EVALUATION:

The instructor will inspect the finished product.

JOB: Erect Exterior Wall Sections

UNIT VI: Wall Framing

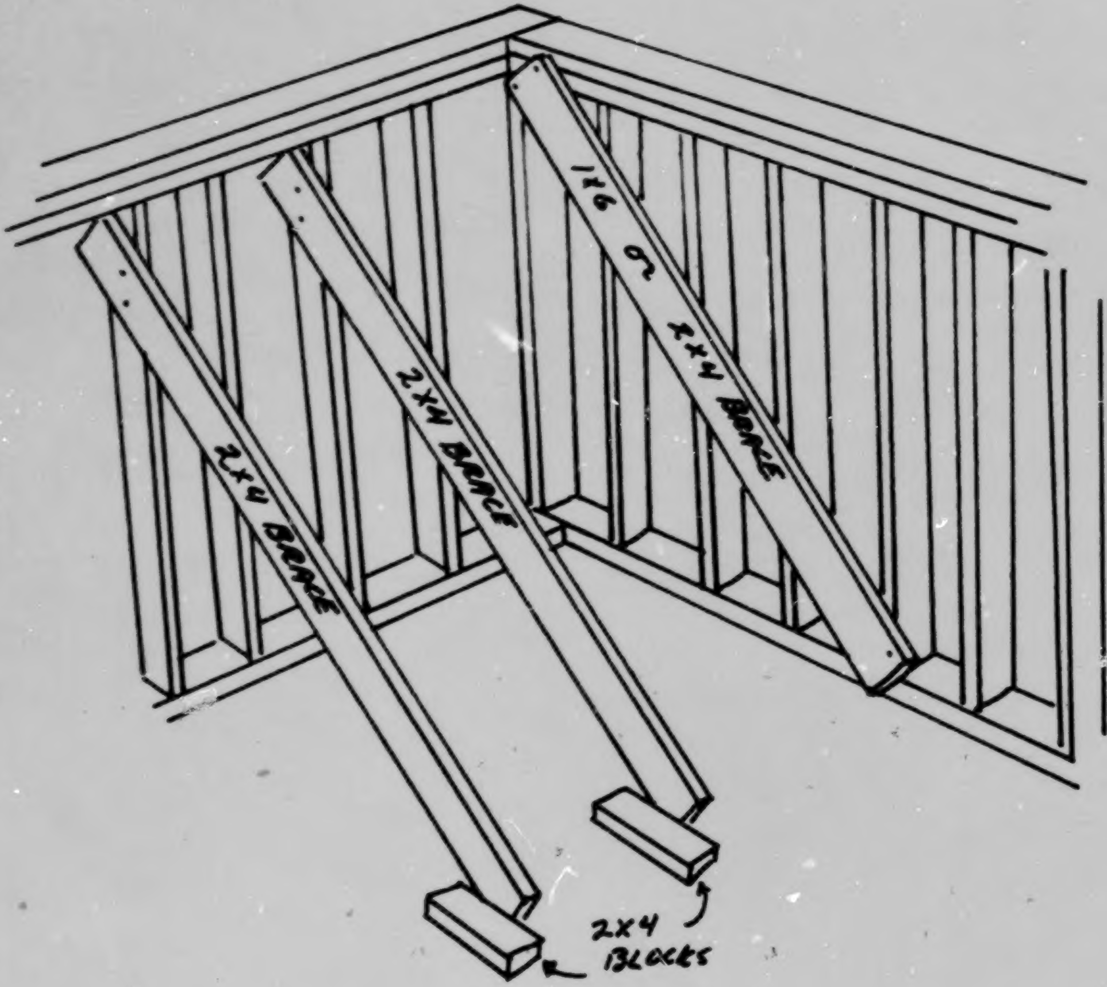
COURSE: Carpentry

MATERIAL: Student will list materials, equipment and tools necessary to complete job as assigned by instructor.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-8

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. After the section of wall frame is assembled and openings framed in, raise into position.	
2. Grasp the frame by the top plate and lift it up and out, making sure the bottom of the frame will rest on the floor and will not slide off.	
3. As the frame reaches a vertical position, steady it and not let it become overbalanced or the wind will take it on over.	NOTE: Have the braces and 2" x 4" blocks ready so that when the frame is upright, you will be able to reach them and get them in place and the walls secured as soon as possible.
4. Attach a temporary brace to the upper end of a stud near each end of the wall section and others along the wall as required. See sketch.	
5. Align sole plate with the edge of the floor platform and fasten with 16d common nails.	
6. Hold a carpenter's level and a straightedge against a stud to which a brace has been nailed, and when the level indicates that the wall is plumb, nail the brace fast to a 2" x 4" block attached to the sub-floor.	
7. Fasten wall sections together at corners and at splices where two sections are joined end to end.	NOTE: Use 10d or 16d nails for fastening the wall sections.
8. Continue erecting wall sections until all outside walls are in place and temporarily braced.	


2x4 BRACE
2x4 BRACE
1x6 or 2x4 BRACE
2x4 BLOCKS

METHOD OF EVALUATION:

The instructor will inspect the finished wall frame.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-9

JOB: Lay Out, Assemble and Erect Exterior Wall Framing

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL:
2 X 4 Stock for Plates and Shoe
2 X 4 Stock for Studding
2 X 4 For Temporary Bracing

EQUIPMENT:
Portable Power Saw
Trestles
5' Stepladder
Extension Cord

TOOLS:
Hammer
Level
Plumb Bob
8 Point Hand Saw
Chalk Line
Rule and Pencil
Framing Square
Combination Square

SAFETY PRECAUTIONS:

1. Be careful while working around floor platform.
2. Use care when handling long or heavy materials.
3. The correct way to handle tools and materials is usually the safest way.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select and cut 2 X 4 studding shoe (sole plates) to length.	. SC-6-1 . SC-6-3 through SC-6-8
2. Lay out stud shoe (sole plates) for regular studs spaced 16" on center.	. IL-6-1 through IL-6-3
3. Lay out for studs at openings and partitions.	. IL-6-5 . IL-6-7
4. Select and prepare top plates.	. IL-6-13
5. Transfer stud layout from stud shoe to top plate.	
6. Lay out and cut a master stud pattern.	
7. Prepare a cutting box or jig.	
8. Cut required number of studs.	
9. Prepare corner posts.	
10. Assemble wall frame sections, omitting studs at openings.	

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
11. Cut and prepare door window headers.	
12. Cut jack and cripple studs.	
13. Frame openings.	
14. Erect wall frame sections and temporarily brace. Fasten sections together at ends and corners.	NOTE: If let-in diagonal braces are required, they should be installed while framework is still on floor.
15. Plumb and brace all exterior corners.	

METHOD OF EVALUATION:

1. Layout
2. Accuracy of cuts
3. Alignment
4. Quality of finished work

JOB: Install Nailers and Backing at Intersections

UNIT VI: Wall Framing

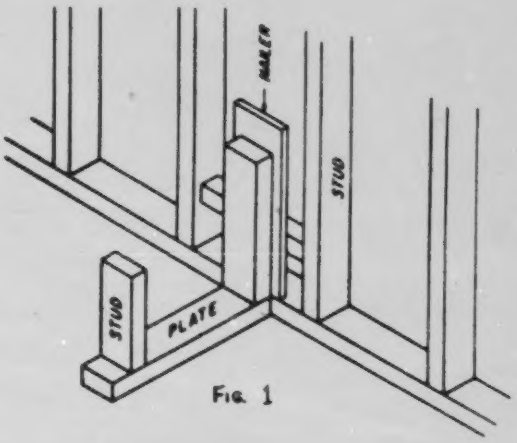
COURSE: Carpentry

MATERIAL: Stud - Mock Up
1 Piece, 1 X 8 X 8'-0"
5 Pieces, 2 X 4 X 1'-4"
10d Common Nails

TOOLS: As needed

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-10

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Locate the wall studs between which the partition will be framed.	 Fig. 1
2. Cut 2" X 4" 's to length and fasten between the studs about every 24" as shown in Fig. 1, keeping the 2" X 4"'s back from the edge of the studs a distance equal to the thickness of the 1 X 8 nailer.	
3. Plumb up from the edge of the sole plate, lay out line on floor and place marks on the 2" X 4" cross nailers and on the top plates.	
4. From this mark, which is the face of the partition, measure out 2" to locate the edge of the 1" X 8" backing.	
5. Snap a chalkline through the marks across the 2" X 4" cross nailers.	NOTE: This line locates the 1" X 8" backing to which the partition will be fastened.
6. Cut the 1" X 8" nailer to length and nail it to the 2" X 4" cross nailers at the chalkline just made, using 8d or 10d nails as required, and if splicing is necessary, make the splice on a cross nailer.	NOTE: Some carpenters prefer to use a 2" X 8" instead of a 1" X 8". In this case, the 2" X 4" cross nailers would have to be held back the thickness of the 2" X 8".
7. Plum up to locate the exact edge of the partition and place a mark on the 1" X 8" nailer.	NOTE: This is the line to which the partition will be set.

8. Use the same procedure to provide nailing where a non-bearing partition intersects the ceiling. See Fig. 2.

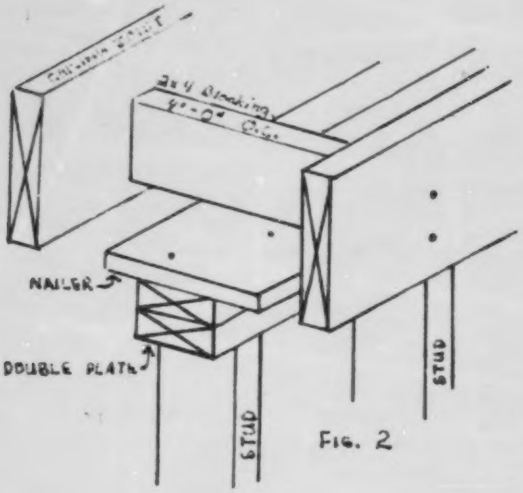

Ceiling Joist
2x4 Blocking
4'-0" O.C.
NAILER
DOUBLE PLATE
STUD
STUD

Fig. 2

METHOD OF EVALUATION:

Instructor will check the finished work.

JOB: Lay Out, Frame and Erect Partitions

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-11

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL:
2" X 4" Stock for Plates and Shoe
2" X 4" Stock for Studs
1" X 4" Stock for Let-In Braces

EQUIPMENT:
Portable Saw
Trestles
Extension Cord
Stepladder

TOOLS:
Hammer
8 Point Hand Saw
Framing Square
Combination Square
Plumb Bob
Level
Chalk Line

SAFETY PRECAUTIONS:

1. Have plenty of help for heavy lifting.
2. Always be careful when working on scaffolds and ladders.
3. Watch out for your fellow workers.

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Lay out chalk lines on subfloor to locate partitions.
2. Select and cut partition soles and caps.
3. Lay out sole plate to receive studs 16" on center.
4. Lay out for studs at openings and intersections.
5. Transfer layout to partition cap.
6. Prepare required number of studs.
7. Assemble partitions, omitting studs at openings.
8. Prepare headers and jack studs.
9. Frame openings in partitions.
10. Prepare and install nailers and backing (as required at intersections with outside walls and other partitions).

TEACHING/LEARNING ACTIVITIES

. SC-6-1

. SC-6-2

. SC-6-9

. IL-6-8

. IL-6-9

. IL-6-11

NOTE: Some carpenters frame all partitions with double caps, while others use double caps on bearing partitions only. For partitions with single caps, the studs must be 1 1/2" longer than for those with double caps.

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
11. Erect partitions and fasten in place. (Use temporary bracing if necessary.)	NOTE: Some carpenters prefer to frame and erect bearing partitions only at this time and set remaining partitions after the ceiling joists are in place.

METHOD OF EVALUATION:

1. Layout
2. Installation sequence
3. Framing
   a. Square
   b. Plumb
4. Strength of partitions

JOB: Install Double Top Plates

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-12

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: 2 X 4's to complete the job as assigned by the instructor

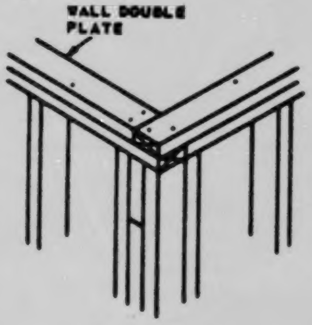
EQUIPMENT AND TOOLS: As selected by the student

SAFETY PRECAUTIONS:

Use care when climbing on walls or on ladders.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

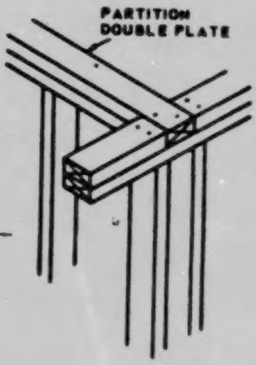
1. Select materials and cut to length allowing for overlapping at corners and intersections.
2. Lay a top member down on top of the wall so it overlaps at the corner (see Fig. 1).
3. Start nailing at one end only, using 10d common nails; two at each end and one every 16" staggered back and forth.
4. Make splices or joints at least 4' from a joint in the piece below.
5. Continue to fasten the pieces in place, allowing partition caps to overlap wall plates as corners were overlapped. See sketch.



WALL CORNER

NOTE: If the lower member of the double wall plate (already in place) is straight, then select a straight piece to double up with. If the lower piece is quite bowed, select a piece to match. When placed so the bows are opposite, they will counteract each other and help to straighten the wall.

NOTE: As you nail the top piece, proceed from one end to the other, moving the free end back and forth as required so as to keep the two pieces exactly flush as they are fastened.



PARTITION INTERSECTING OUTSIDE WALL

METHOD OF EVALUATION:

Checked by instructor.

JOB: Align and Brace Walls and Partitions

UNIT VI: Wall Framing

COURSE: Carpentry

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-13

MATERIAL:	2 X 4 Braces 2 X 4 Blocks	16d Common Nails 10d Common Nails
EQUIPMENT:	Portable Electric Saw Stepladder	Extension Cord Trestles
TOOLS:	Hammer Chalk Line	Rule and Pencil 3 Small Blocks

SAFETY PRECAUTIONS:

Be careful when erecting wall sections beside edge of floor platform. Walls may become overbalanced and fall off the platform, taking workers with it.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Plumb and brace all exterior corners in both directions.
2. Prepare gage blocks (approximately 3/4" x 1 1/2" x 2").
3. Nail one block to the top plate at each end of the wall being straightened.
4. Stretch and secure a chalkline or dry line to nails driven just beyond blocks as shown in Fig. 1.
5. Near the middle of the wall, nail a brace to the side of a stud just underneath the top plate as in Fig. 2.
6. Fasten additional braces at approximately 8' intervals along the wall.
7. Nail a 2 x 4 block to the floor frame at the lower end of each brace.
8. Check wall with gage block (Fig. 3).

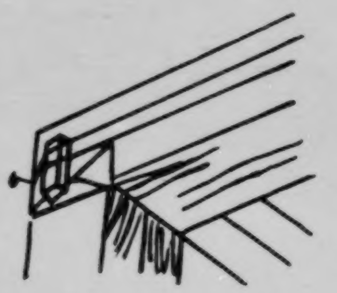


Fig. 1

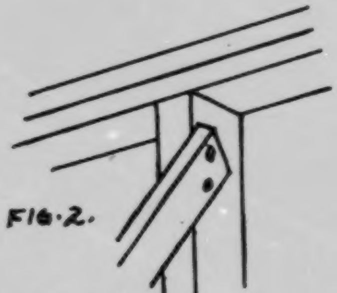


Fig. 2.

NOTE: Nailing must be through the sub-floor into the joist.

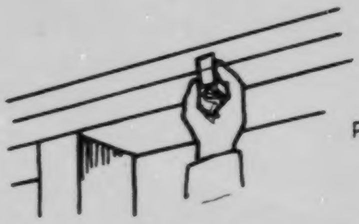


Fig. 3

9. Move the wall until the gage block just passes between the wall plate and the line, (see Fig. 4) then nail the brace at the bottom.

10. Check the wall at each point where a brace has been placed and when the wall is in position, nail the braces at the bottom.

11. Recheck alignment and install additional braces if any portion of the wall is not in alignment.

12. Align and brace all walls and partitions.

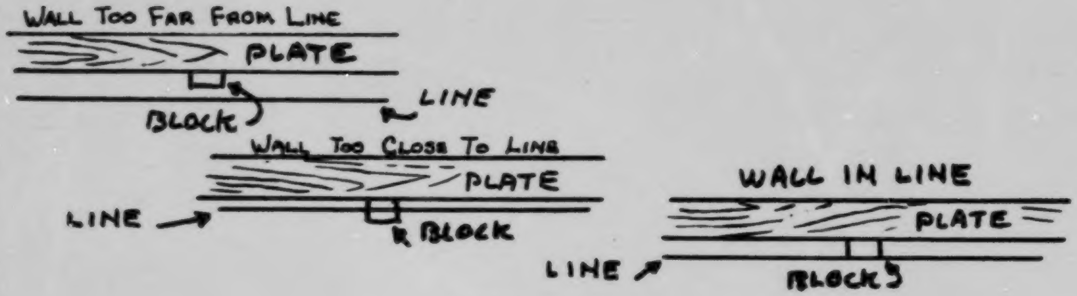

WALL TOO FAR FROM LINE
PLATE
LINE
BLOCK
WALL TOO CLOSE TO LINE
PLATE
LINE
BLOCK
WALL IN LINE
PLATE
LINE
BLOCK

FIG. 4

METHOD OF EVALUATION:

The instructor will check the finished work.

JOB: Install "Let-In" Corner Braces

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: 1 X 4 Braces as requested for job as assigned by the instructor.

EQUIPMENT: To be listed by the student.

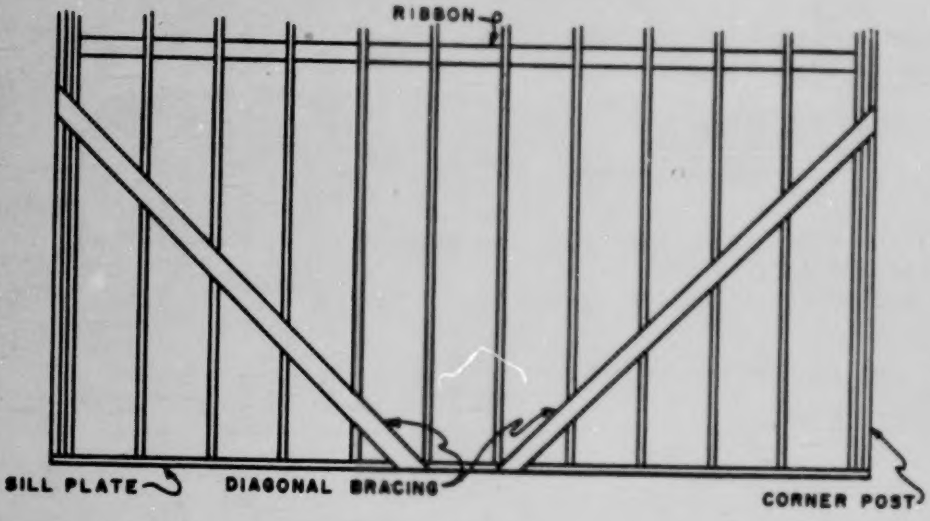
JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-14

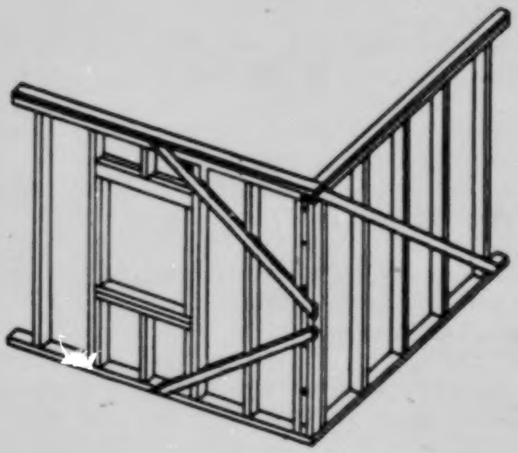
SAFETY PRECAUTIONS:

1. Be careful when using chisels and other sharp edge cutting tools.
2. All electric tools must be grounded.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Study sketches and determine the position of the brace.	NOTE: The let-in corner brace can be installed before the frame is raised into position or after. In either case, the frame must be carefully aligned and squared while on the floor or plumbed when in a vertical position.
2. Snap a chalkline across the corner of the wall frame at the location of the brace. 3. Hold or temporarily tack the brace along this line and mark along the other side of the brace to layout the position and width of each gain to be cut out.	NOTE: The saw cuts can be made with an 8-point handsaw, or the portable electric saw can be set to the depth of the gain and the cuts thus made.
4. Remove the brace and with a combination square, gage a line on each side of the studs to the depth of the cuts. 5. Make a saw cut on each side of the gain to the depth of the gage lines.	NOTE: Some carpenters use a sharp hatchet to cut out the gains; however, care should be taken not to strike the hatchet with a hammer, but rather a wood or rubber mallet should be used.
6. Use a wood chisel and score the gage line on each side. 7. Working from the top down, cut away the wood until you reach the gage line on each side. 8. When all of the gains have been cut out, place the brace in position and fasten with two 8d nails at each stud.	NOTE: The braces should be flush with the outside of the studs so they don't interfere with the sheathing. Do not cut the gain too deep or too loose, as this will weaken the stud and make the brace less effective.


RIBBON
SILL PLATE
DIAGONAL BRACING
CORNER POST

BRACING A WALL SECTION



Bracing set into walls to add rigidity to the framework.

METHOD OF EVALUATION:

The instructor will check finished work.

JOB: Apply Plywood or Composition Wall Sheathing

JOB SHEET IDENTIFICATION CODE

UNIT VI: Wall Framing

JOB NUMBER: J-6-15

COURSE: Carpentry

MATERIAL: 1/2" X 4' X 8' Sheathing (Plywood or Composition)

EQUIPMENT: To be listed by the student

SAFETY PRECAUTIONS:

1. Erect scaffolding as required.
2. Be careful when working above others.
3. Follow all safety rules.
4. Think safety.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select materials as needed for job.	
2. Follow the procedure listed below to install the sheathing either vertically or horizontally according to plan.	
A. FOR HORIZONTAL APPLICATION: (WALL ERECT)	
1. Nail a piece of sheathing in position along the bottom of the outside wall on top of the foundation, with one end even with the corner of the building and the other end centered on a stud.	NOTE: The sheathing should be started at the corner from which the studs were laid out so the first sheets will work out for 16" spacing. Any cutting can be done at the other end.
2. Set up several more pieces along the wall, cutting out for openings where necessary and tacking each piece fast as it is set up.	
3. When the bottom row is in place, sight along the top edge of the sheathing. If the sheets appear to be straight and properly placed, fasten them securely with nails driven at each stud.	NOTE: One by four let-in diagonal braces are recommended at the corners of the wall frame when composition sheathing is used. Use 6d coated nails for board or plywood sheath and 2" galvanized roof nails for composition sheathing.
4. Continue to set pieces of sheathing in place, resting them on top of the row below, and breaking joints in each successive row.	
5. Fasten each sheet with nails driven into each stud and around openings.	

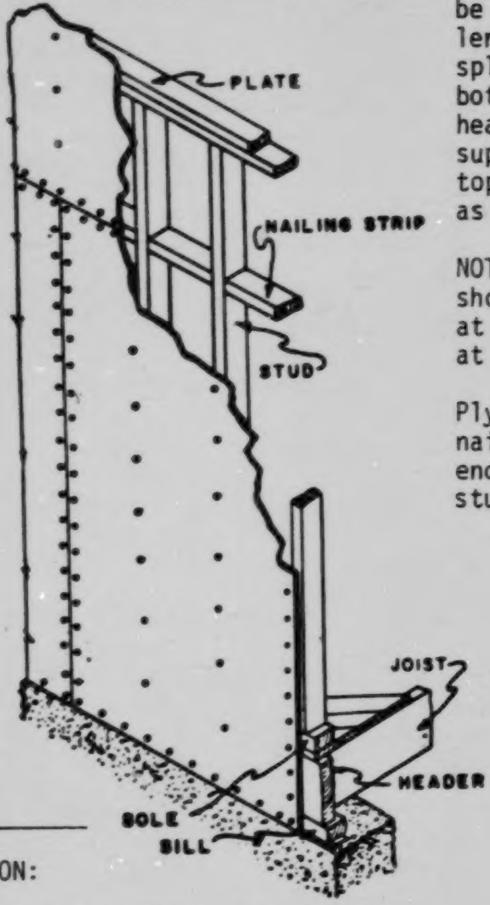
B. FOR VERTICAL APPLICATION: (WALLS ERECT)

6. Place the first sheet in position at one corner of the building.

7. Align the sheet carefully along the corner post and nail every 6" along the edge of the sheet.

8. Finish nailing the sheet.

9. Continue to cut and fit sheets to length and around openings and fasten in place.



METHOD OF EVALUATION:

Instructor will inspect finished work.

NOTE: When composition sheathing is applied vertically and a sheet of plywood is used at each corner, diagonal let-in braces are not necessary.

NOTE: For vertical application, full length sheets should be used if possible. When full length sheets are not available, splicing can be done at the bottom of the wall on the joist header so splice will have support behind it, or at the top installing nailing strips as shown in Fig. 1.

NOTE: Composition sheathing should be nailed 4" O.C. at edges and ends and 6" O.C. at intermediate studs.

Plywood sheathing should be nailed 6" O.C. at edges and ends and 8" O.C. on intermediate studs.

JOB: Apply Wall Sheathing (Horizontal Board)

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-16

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: 1" X 6" Roofers
1/2 X 4' X 8' Sheathing
8d Box Nails
6d Coated Box Nails

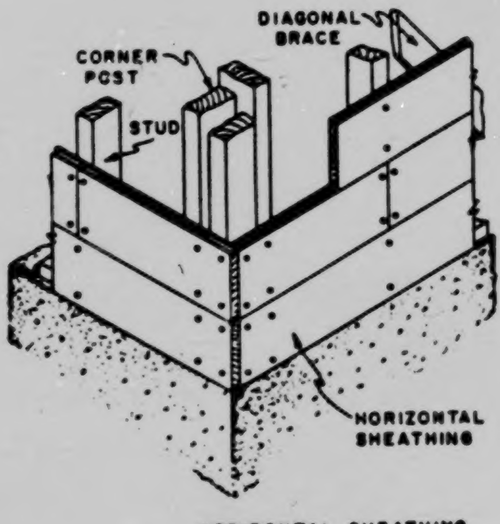
EQUIPMENT: Portable Power Saw
Trestles
Extension Cord

TOOLS: Hammer
Rule and Pencil
8 Point Saw

SAFETY PRECAUTIONS:

1. Follow all safety precautions when working from a scaffold.
2. Do not aimlessly throw waste material from the scaffold.
3. Think safety.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. When walls are erect, start the first piece of sheathing at the foundation. The first two or three rows can be spliced anywhere on the sill framework. Otherwise, boards should be spliced on studs.	NOTE: Some carpenters prefer to erect outside walls before applying wall sheathing. Others apply the sheathing while the framework is lying flat on the platform.
2. Set sheathing in place on top of foundation wall.	
3. Continue to cut and fit sheathing boards, breaking joints in each successive row and splicing on a stud.	
4. Fasten sheathing with two 8d box nails at each stud.	
5. Trim off waste around openings and at the corners.	



HORIZONTAL SHEATHING

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
6. When sheathing is applied while framework is still flat on the platform, determine the exact starting position of the sheathing on the framework.	
7. Align and square the framework and temporarily fasten to platform.	
8. Snap a chalk line at the starting point.	
9. Cut and fit the first strip of sheathing and fasten in place along chalk line at starting point.	
10. Continue to cut and fit sheathing in the same manner described above, breaking joints in each successive row and splicing on studs.	
11. After wall sections are sheathed and have been raised into position and secured, cover the space around the floor platform with sheathing.	

METHOD OF EVALUATION:

1. Layout
2. Sequence of nailing
3. Appearance of finished job

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-17

JOB: Apply Diagonal Board Sheathing

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: 1 X 6 Sheathing Boards
8d Box Nails

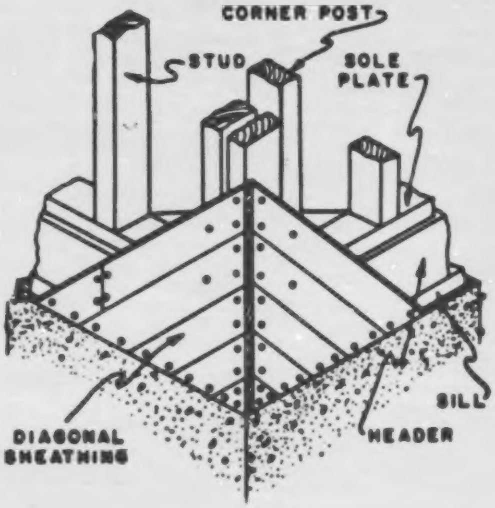
EQUIPMENT: To be listed by the student.

SAFETY PRECAUTIONS:

1. Be careful when using chisels and other sharp edge cutting tools.
2. All electric tools must be grounded.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

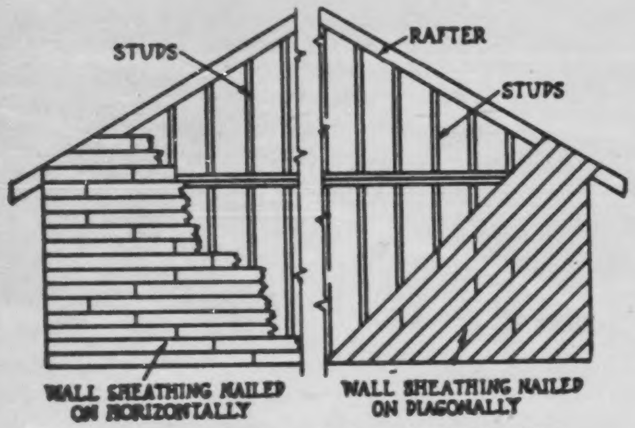
1. Study attached sketches (Fig. 1 & 2).
2. Measure from the corner of the building out along the foundation wall and place a mark at 6'. Likewise, measure up the corner post and mark 6'.
3. Snap a chalkline across the studs from one 6' mark to the other. This is the starting line and is repeated at the other end of the wall.
4. Cut the first piece of sheathing to length and fasten it in place along this line.
5. Reverse the sheathing and backlay to the corner.
6. Continue, from starting line, cutting and fitting sheathing and nailing in place using two 8d common nails in each stud.
7. Repeat this procedure at the other end of the wall so that the sheathing will be laid in opposite directions, and will meet and splice on the center of a stud near the middle of the wall.
8. Cut off waste material at corners and around openings before it is applied to walls that are erect. If the walls are sheathed while on the platform, the waste may be cut off with a power saw.



DIAGONAL SHEATHING

Fig. 1

NOTE: If diagonal board sheathing is side and end matched, the end joints may occur between studs. Otherwise, the splices should be made on the center of a stud. The splice can be square cut or on an angle of 45°, as shown in Fig. 2.


STUDS
RAFTER
STUDS
WALL SHEATHING NAILED ON HORIZONTALLY
WALL SHEATHING NAILED ON DIAGONALLY

Nailing on solid-wood wall sheathing.

Fig. 2

METHOD OF EVALUATION:

Instructor will inspect the finished work.

JOB: Construct a Single or Double Pole Scaffold

JOB SHEET
IDENTIFICATION CODE

UNIT VI: Wall Framing

JOB NUMBER: J-6-18

COURSE: Carpentry

MATERIAL:
2" x 4" Uprights
2" x 6" Ledgers
1" x 6" Bracing
2" x 10" Planking
2" x 10" Blocking
8d Nails
10d Nails
16d Nails

EQUIPMENT:
Portable saw
12' Ladder
Trestles
Extension Cord

TOOLS:
Hammer
8 Point Saw
Rule and pencil
Hatchet

SAFETY PRECAUTIONS:

1. Follow safety code and regulations for scaffold construction.
2. Follow safety precautions for safe construction and use of scaffolds.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare upright bearing blocks or pads for single pole scaffold.	
2. Select uprights and inspect for safe and sound condition.	
3. Prepare 2" x 6" ledgers (maximum 4' long).	
4. Prepare 2" x 6" notched wall bearing blocks, and fasten them to one end of each 2" x 6" ledger, as shown in Fig. 1.	
5. Attach the opposite end of the ledger to an upright at correct height.	NOTE: Use proper nailing. Double head (Duplex head) nails may be used for easy removal, except to nail down planks.
6. Set uprights in position on bearing blocks and fasten notched bearing blocks securely to building wall, nailing into wall framing.	
7. Apply a ribbon or 2" x 4" bearing blocks to support ledger.	

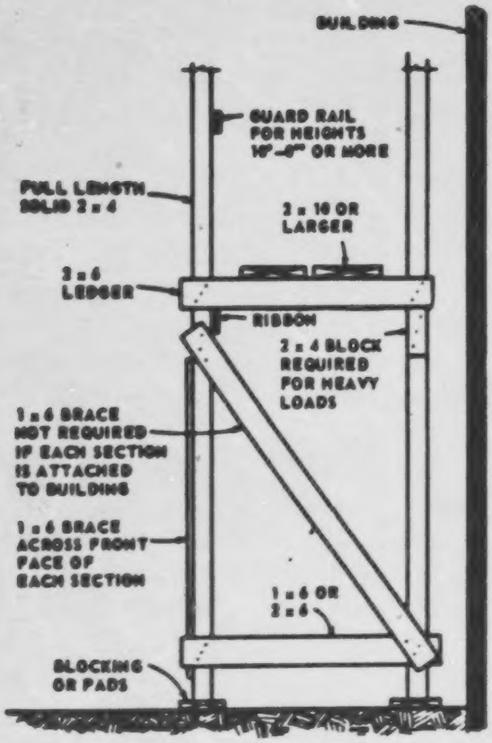
8. Prepare 1" x 6" or 2" x 6" braces and nailing blocks to brace lower end of upright post.

9. Attach one end of brace to post and nail the block at the other end to the building wall, as shown in Fig. 1.

10. Apply 1" x 6" diagonal bracing to outside of upright posts.

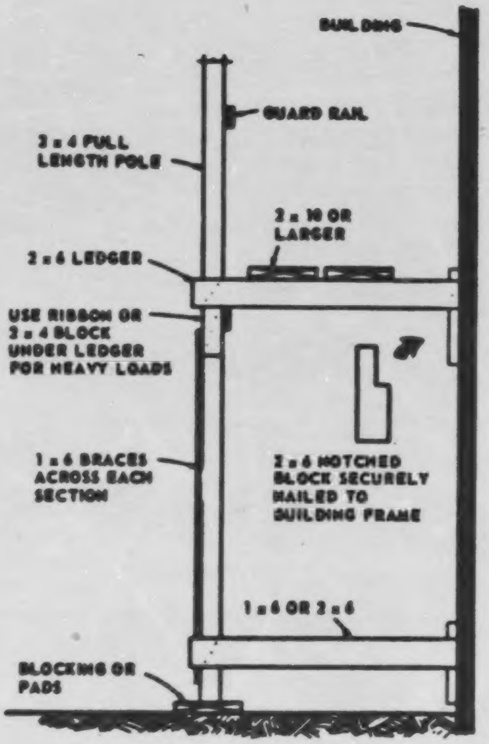
11. Lay plank platform as shown in drawing and according to code regulations.

12. Apply safety guard railing and toe board according to regulations.


BUILDING
GUARD RAIL FOR HEIGHTS 10'-0" OR MORE
FULL LENGTH SOLID 2 x 4
2 x 10 OR LARGER
2 x 6 LEDGER
RIBBON
2 x 4 BLOCK REQUIRED FOR HEAVY LOADS
1 x 6 BRACE NOT REQUIRED IF EACH SECTION IS ATTACHED TO BUILDING
1 x 6 BRACE ACROSS FRONT FACE OF EACH SECTION
1 x 6 OR 2 x 6
BLOCKING OR PADS

. Typical design for double-pole scaffold. Structure can be extended up to form several platforms. Maximum height should be limited to 18 feet.

Figure 2


BUILDING
GUARD RAIL
2 x 4 FULL LENGTH POLE
2 x 10 OR LARGER
2 x 6 LEDGER
USE RIBBON OR 2 x 4 BLOCK UNDER LEDGER FOR HEAVY LOADS
1 x 6 BRACES ACROSS EACH SECTION
2 x 6 NOTCHED BLOCK SECURELY NAILED TO BUILDING FRAME
1 x 6 OR 2 x 6
BLOCKING OR PADS

Typical design for a single-pole scaffold. Horizontal distance between ledger sections should never exceed 10 feet.

Figure 1.

NOTE: The same general procedure is followed when building a double pole scaffold. However, the notched bearing blocks are omitted and a second upright is used in its place. In addition, diagonal bracing is used at each pair of upright posts, as shown in Fig. 2. or each section may be tied to the building at each level.

METHOD OF EVALUATION:

1. Preparation
2. Layout
3. Safety features
4. Quality of completed work

JOB: Erect Metal Scaffold

UNIT VI: Wall Framing

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-19

DRAWING NO: D-6-19

MATERIAL:
Metal Scaffold Sections
Blocking Base Pads
Two Sets of Braces for Each Section
2" X 10" Planks
2" X 4" Railing

EQUIPMENT:
Portable Saw
Extension Cord

TOOLS:
Hammer
Shovel

SAFETY PRECAUTIONS:

Follow guidelines for scaffold construction and erection as described in the local building code or Department of Labor and Industry Handbook on Scaffolds.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare base pads for upright sections to rest on and level ground with shovel where necessary. (Fig. 1)	. D-6-19
2. Place two scaffold sections in upright position. (Fig. 2)	. D-6-19
3. Check to see that base pads are resting solid and that scaffold is level.	
4. Apply diagonal braces.	
5. Continue to prepare base pads and assemble upright scaffold sections joining each section to the previous section with diagonal braces.	
6. When scaffold is completely assembled, apply platform planking.	NOTE: Platform should be 3 or 4 planks wide (see code). Upright sections should be no more than 7' apart. Planks should lap 12" over the ends of adjoining plank. Where possible, every other section of planking should rest on top of adjoining plank at each end.

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
7. To erect a second or third lift, set scaffold sections one on top of the other, as seen in D-6-19.	
8. Apply diagonal braces.	
9. Follow same procedure for applying plank platform on second lift.	
10. Apply safety railing around top lift.	NOTE: The higher the scaffold, the more solid and level should be the base pads.

METHOD OF EVALUATION:

1. Safety practices
2. Sequence of erection

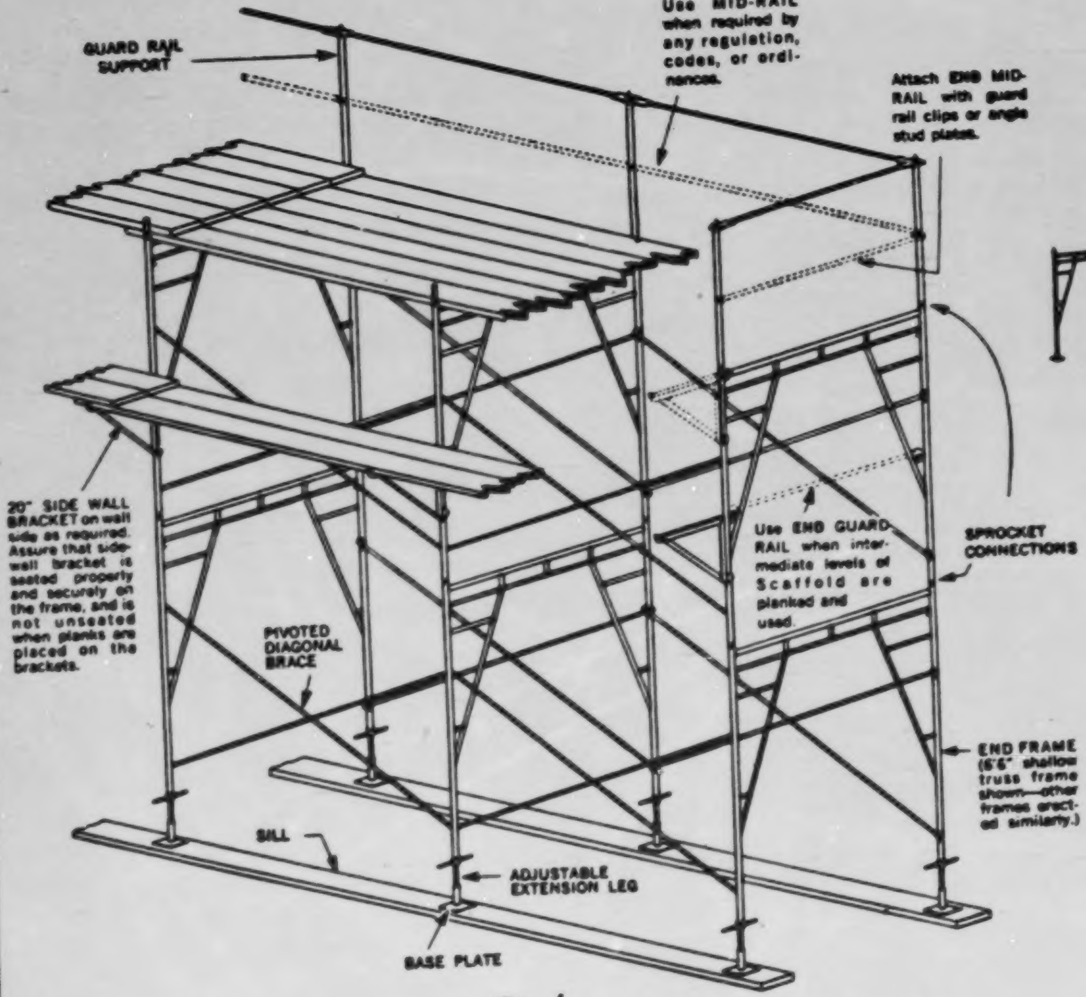

GUARD RAIL SUPPORT
Use MID-RAIL when required by any regulation, codes, or ordinances.
Attach END MID-RAIL with guard rail clips or angle stud plates.
20" SIDE WALL BRACKET on wall side as required. Assure that side-wall bracket is seated properly and securely on the frame, and is not unseated when planks are placed on the brackets.
PIVOTED DIAGONAL BRACE
Use END GUARD RAIL when intermediate levels of Scaffold are planked and used.
SPROCKET CONNECTIONS
END FRAME (6'6" shallow truss frame shown—other frames erected similarly.)
SILL
ADJUSTABLE EXTENSION LEG
BASE PLATE

Fig. 1.
Scaffold assembly made from sections joined vertically and horizontally.
(Patent Scaffolding Co.)

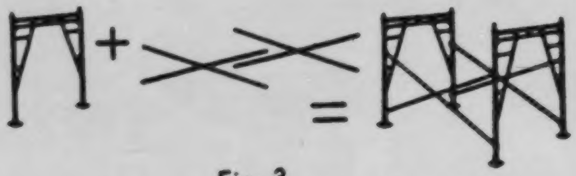


Fig. 2
Scaffold sections can be rapidly assembled from prefabricated trussed frames and diagonal braces.

Metal Scaffolding

DRAWING NUMBER
D-6-19

JOB: Lay Out and Frame Ceiling Joists

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-6-20

UNIT VI: Wall Framing

COURSE: Carpentry

MATERIAL: 2" X 6" Ceiling Joist Stock
2" X 6" Stiffeners

EQUIPMENT: Portable Saw
Extension Cord
Trestles
5' Stepladder
Portable Scaffold

TOOLS: Hammer
8 Point Saw
Rule and Pencil
Framing Square

SAFETY PRECAUTIONS:

1. Use caution when working on the building frame.
2. If it is necessary to walk on top of the walls, use extreme care.
3. Work from a small section of portable scaffold.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Study blueprints to determine spacing of ceiling joists (usually on top of studs).	
2. Lay out top (rafter) plate to receive joist.	
3. Lay out bearing partition cap to correspond with rafter plate layout.	
4. Lay out and cut ceiling joist pattern. (Include angle cut to correspond with roof pitch.)	
5. Cut required number of ceiling joists.	
6. Set joist in position and fasten to walls and partitions.	
7. Align and stay joist.	
8. Install bridging or strongback.	NOTE: A strongback consists of 2" x 6"'s securely spiked across the tops of the ceiling joist about in the middle of the span. The strongback is necessary when bridging or attic flooring is omitted.

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
9. Fasten joists together that overlap bearing partitions.	NOTE: Perform this step (#9) only after walls have been aligned and braced.
10. Install block bridging between joists at bearing partitions, if required.	

METHOD OF EVALUATION:

1. Layout
2. Installation sequence
3. Framing
    a. Square
    b. Plumb
4. Strength of partitions

JOB: Install Special Nailers and Blocking

UNIT VI: Wall Framing

COURSE: Carpentry

TOOLS: Hand or Power Saw, Square, Level, Rule & Pencil, Hammer

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-6-21

SAFETY PRECAUTIONS:

General safety precautions in the use of hand and power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Study blueprints to determine location of special blocking and nailers.	. SC-6-6
2. Determine size and mark location of backing for bathroom lavatory or water closet. Fig. 4 and Fig. 5.	
3. Prepare blocking and fasten in place.	
4. Determine size and location of warm or cold air register openings. Fig. 1.	
5. Cut out stud shoe and subfloor between studs for duct opening. Fig. 2	
6. Lay out and frame header at top of register opening.	
7. Cut short blocks of 2" Y 4" (about 8 or 10 inches) for base blocks, or tub support. Fig. 6 and Fig. 3.	
8. Determine proper location and fasten blocks in all corners where nailing for baseboard is necessary.	

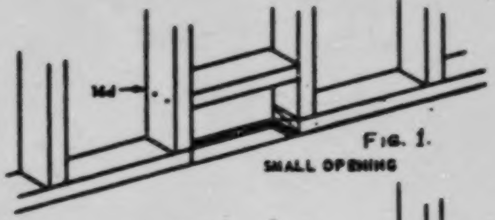


Fig. 1.
SMALL OPENING

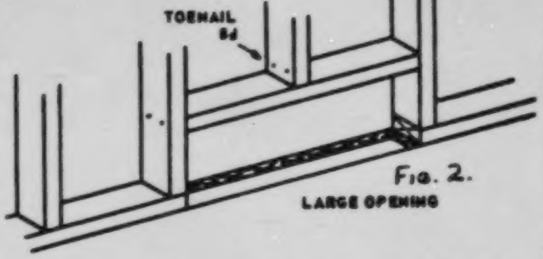


Fig. 2.
LARGE OPENING

Framing openings for heating ducts.

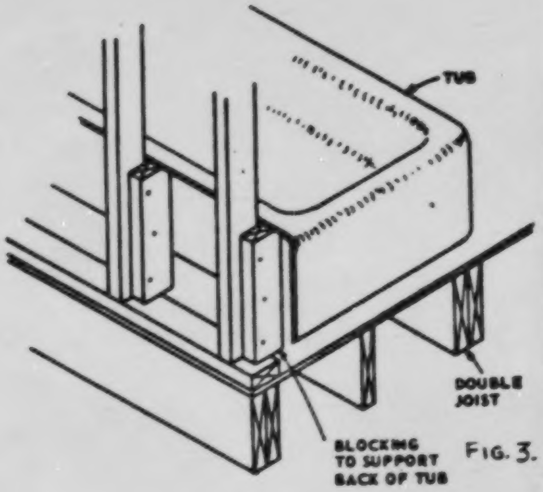


Fig. 3.

Extra support for tub installation.

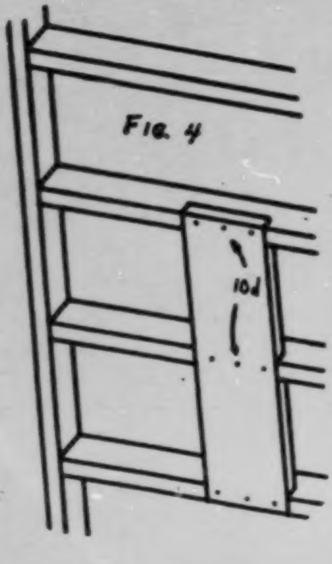


Fig. 4

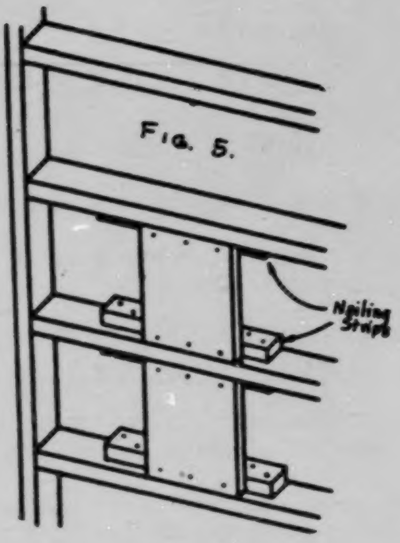


Fig. 5.
Nailing Strips

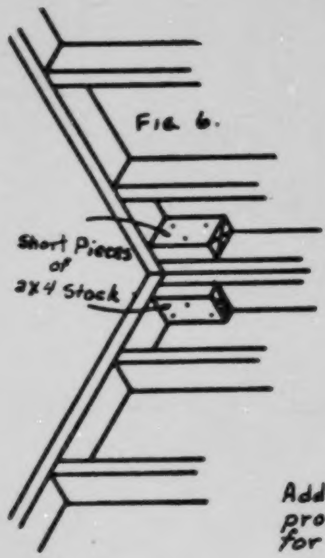


Fig. 6.
Short Pieces of 2x4 Stock

Additional blocking in corners provides better nailing support for baseboards.

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Layout
3. Framing practices
4. Accuracy of work

JOB: Determine Length of Common Rafter (Step Off Method)

JOB SHEET IDENTIFICATION CODE

UNIT VII: Roof Framing

JOB NUMBER: J-7-1

COURSE: Carpentry

DRAWING NO: D-7-1

MATERIAL: 1 Piece, 2 X 6 X 10'

TOOLS: Framing Square

SAFETY PRECAUTIONS:

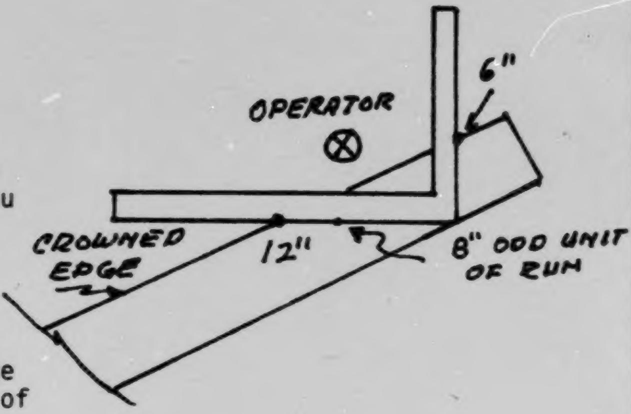
Be safety minded.

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

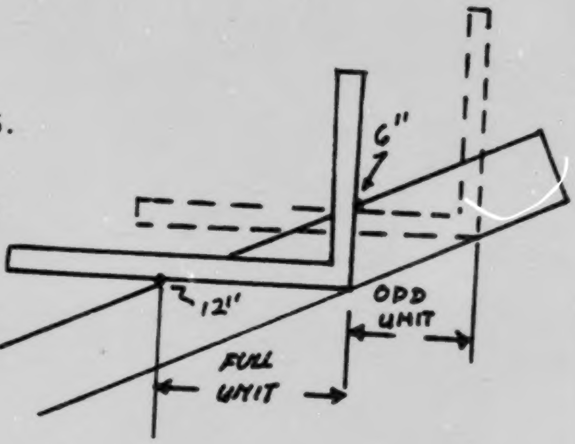
TEACHING/LEARNING ACTIVITIES

---

1. Determine total run of the rafter.
   Example: 7'8"
2. Determine the unit rise.
   Example: 6"
3. Lay the rafter stock on a pair of sawhorses with the crowned side toward you and start layout near the left end.
4. Lay the framing square on the stock with the tongue to left and the open side toward you. The unit rise (6") on the tongue and unit run (12") on the blade should be aligned with the edge of the stock nearest you.
5. Mark the plumb cut along the outside of the tongue and lay off the odd unit of run (8" in this case) along the blade or run side of the square. Mark the stock at the 8" mark.
6. Slide the square along the stock to the right, keeping the unit rise and unit run aligned with the edge of the stock, until the outside of the tongue is aligned with the odd mark made in Step #5.
7. Mark the stock where the 12" mark on the blade and the edge of the stock meet. At this point you have laid out:
   a. the plumb cut
   b. the odd unit of run (8")
   c. one full unit of run (12")



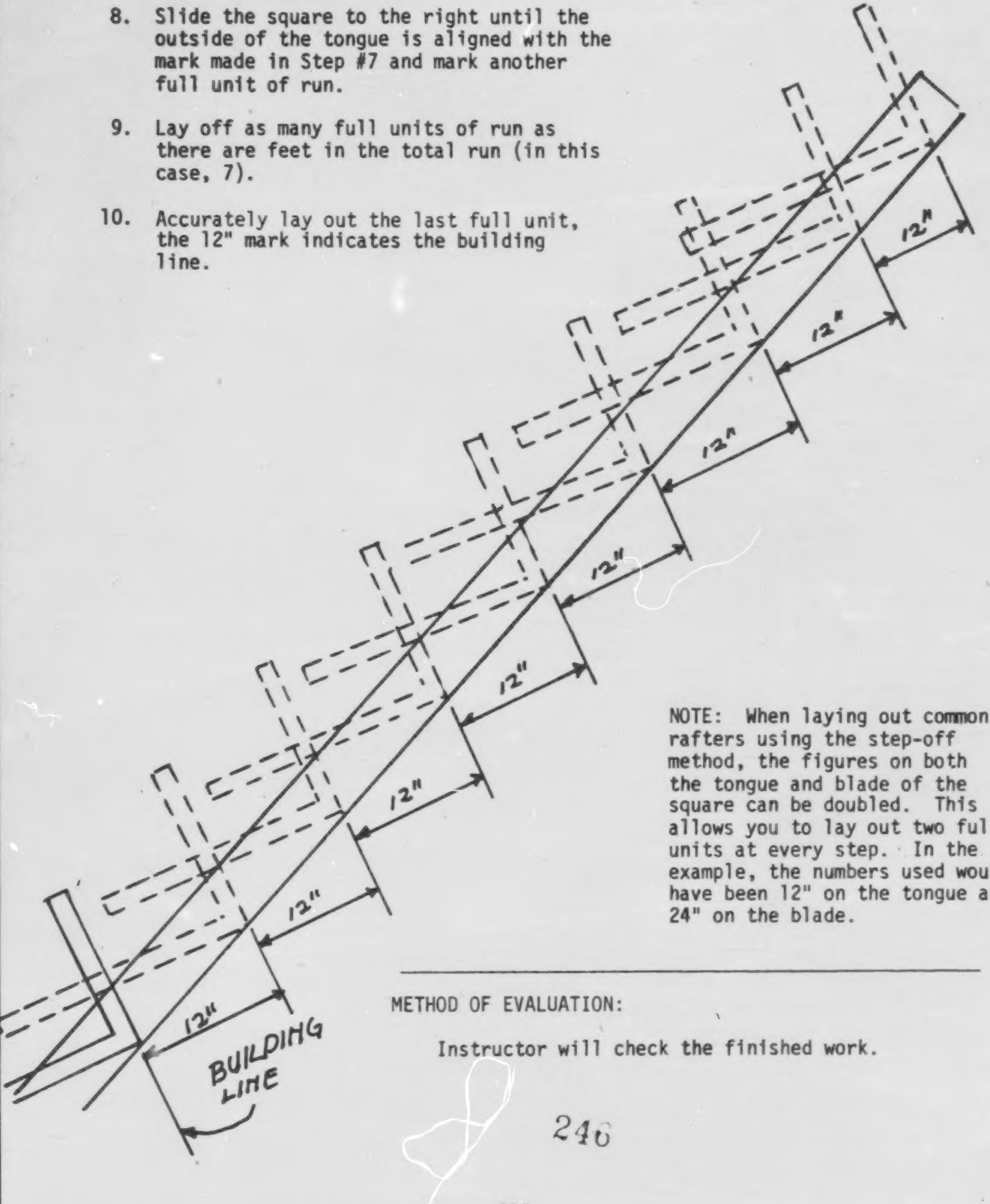
. SC-7-1



8. Slide the square to the right until the outside of the tongue is aligned with the mark made in Step #7 and mark another full unit of run.

9. Lay off as many full units of run as there are feet in the total run (in this case, 7).

10. Accurately lay out the last full unit, the 12" mark indicates the building line.



NOTE: When laying out common rafters using the step-off method, the figures on both the tongue and blade of the square can be doubled. This allows you to lay out two full units at every step. In the example, the numbers used would have been 12" on the tongue and 24" on the blade.

METHOD OF EVALUATION:

Instructor will check the finished work.

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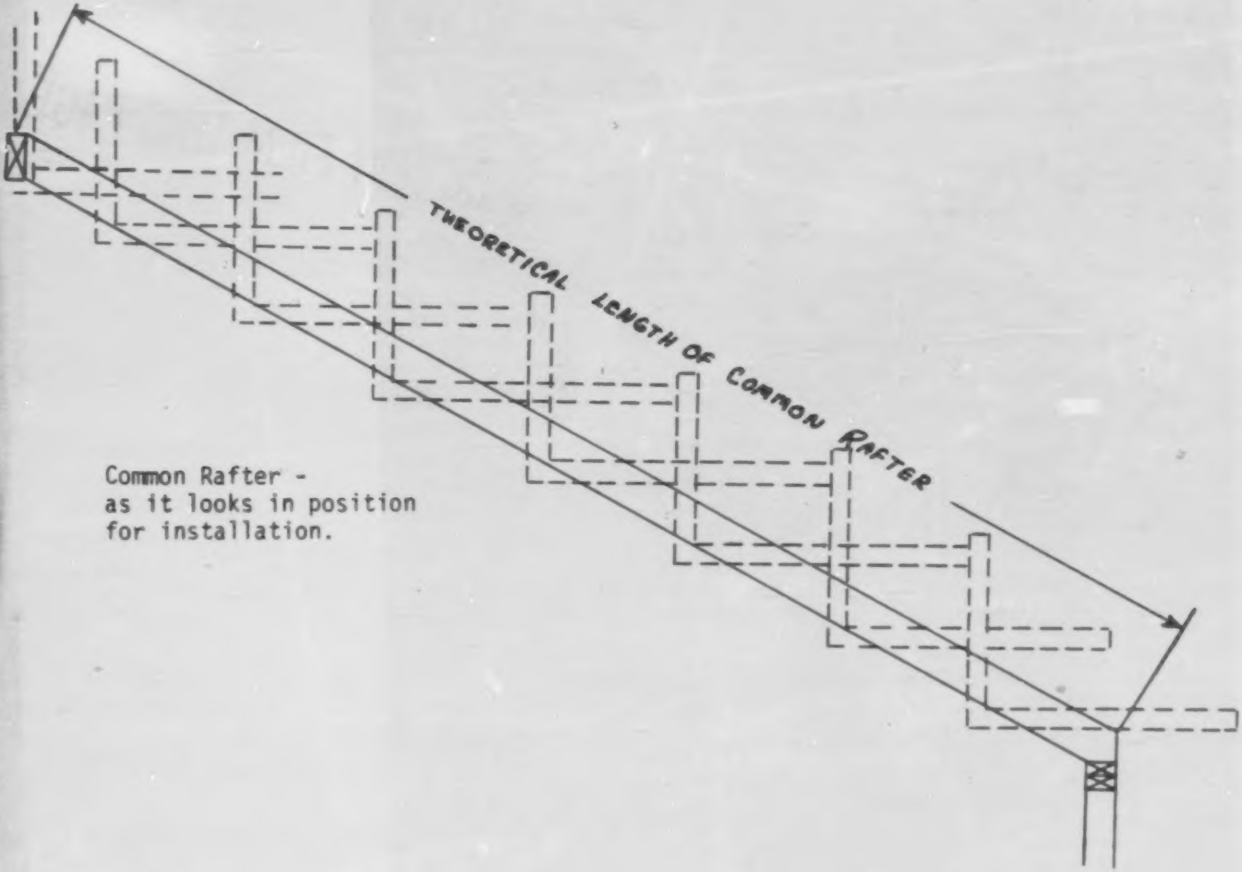

THEORETICAL LENGTH OF COMMON RAFTER

Common Rafter -
as it looks in position
for installation.

RAFTERS

DRAWING NUMBER
D-7-1

JOB: Lay Out Common Rafter Using the Unit Length Method

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-2

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Stock used in J-7-1

EQUIPMENT: Saw Horses

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Always practice general safety

COMPETENCE PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine the total run of the rafter.	Example: 8'0".
2. Determine the unit rise of the rafter.	Example: 4".
3. Lay off the plumb cut so the crowned edge of the rafter will be on the top when the rafter is in position.	. SC-7-1
4. Find the rafter tables on the face of the blade of the framing square.	
5. Locate the 4" mark on the outside edge of the rafter tables. This represents the unit rise.	
6. Find the unit or slope length of the rafters for every foot of run by looking along the line marked "length of common rafters per foot of run" until you come to the 4" mark and under the 4" mark on the first line you will see the slope length 12.65.	
7. Multiply the slope length (12.65) times the number of feet of run to give the length of the rafter from the center of the building to the outside building line.	Example: 12.65 X 8 = 101.20" or 8'-5 3/16"
8. Lay out this measurement along the top or bottom edge of the rafter from the plumb cut marded in step #3.	NOTE: If there is an odd unit of run, it is usually easier to lay it off as you would when using the step-off method.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
9. Determine the length of a common rafter with a total run of 8'-6" and a unit rise of 5".	
10. Mark off length of rafter after old marks are sanded off.	

METHOD OF EVALUATION:

Instructor will check the layout.

JOB: Lay Out Bird's Mouth Notch on a Common Rafter

JOB SHEET IDENTIFICATION CODE

UNIT VII: Roof Framing

JOB NUMBER: J-7-3

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 6 X 4'

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Be safety minded.

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

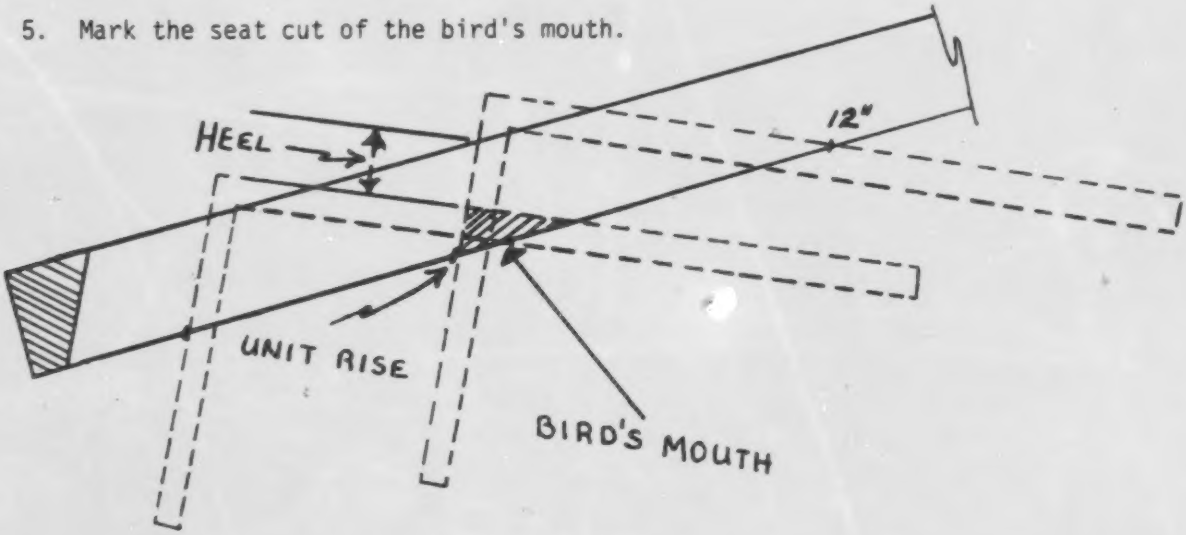
1. Lay the square on the stock to the "cut of the roof" (unit rise on tongue and 12" on blade, aligned with same edge of stock).
2. Draw a plumb line along the tongue of the square indicating the building line.
3. Lay off the heel dimension along this line from the top edge of the rafter.
4. While holding the square to the "cut of the roof", slide the framing square along the rafter until either side of the blade is aligned with the mark made in Step #3.
5. Mark the seat cut of the bird's mouth.

TEACHING/LEARNING ACTIVITIES

Use the following procedure to lay out the bird's mouth cuts for the rafters listed in the chart.

Unit Rise	Heel Dimension
6"	3 1/2"
8"	5"
5"	4 1/4"
4 1/2"	5 1/2"

. SC-7-1



METHOD OF EVALUATION:

Instructor will check the finished work.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-4

DRAWING NUMBER: D-7-4

JOB: Lay Out For Overhang on Common Rafter

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Material from previous job, marks sanded off

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Always remember to work safely.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine overhang or projection from plans.	
2. Hold the square on the rafter stock to the "cut of the roof" (6-12). The dimension of the overhang (8") should be aligned with the building line (plumb cut of the bird's mouth). See Fig. 1.	
3. Mark tail cut on rafter along the tongue of the square.	
4. Lay out overhang for a rafter having a 1'-4" overhang and a unit rise of 7".	
5. Lay out overhang for a rafter having a 2'-0" overhang and a unit rise of 8".	

METHOD OF EVALUATION:

Instructor will check lay out against the plans.

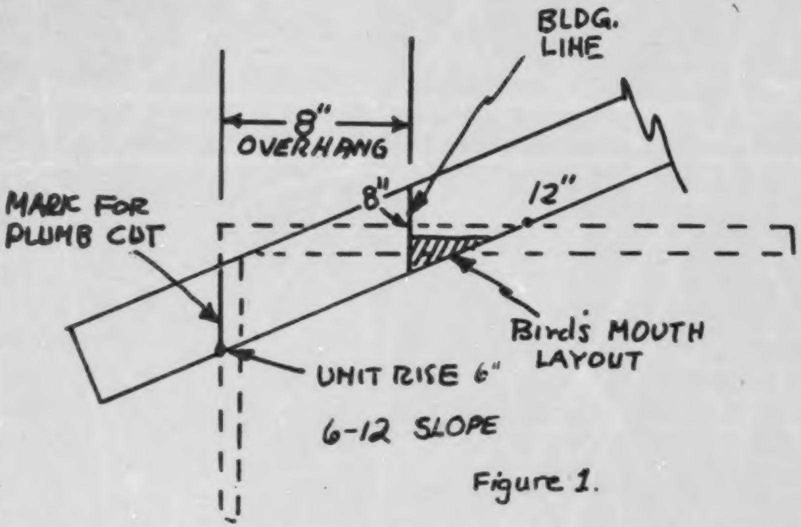

BLDG. LINE
8" OVERHANG
MARK FOR PLUMB CUT
8"
12"
Birds MOUTH LAYOUT
UNIT RISE 6"
6-12 SLOPE

Figure 1.

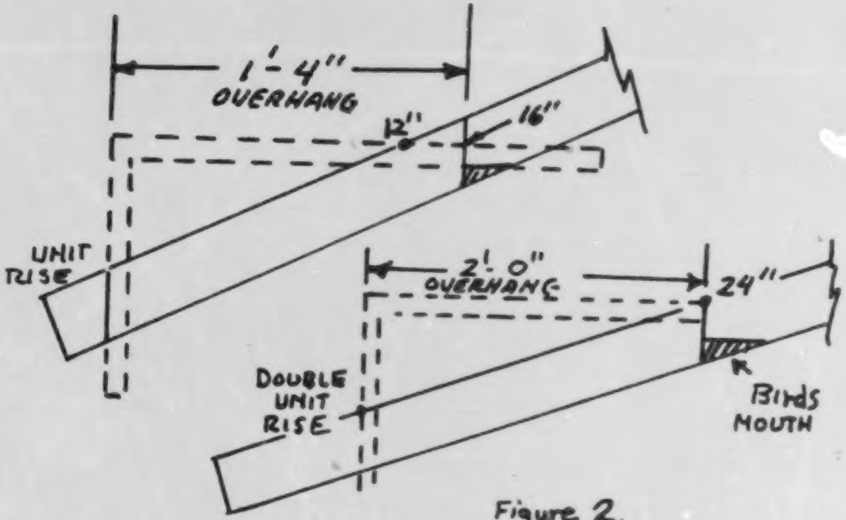

1'-4" OVERHANG
12"
16"
UNIT RISE
2'-0" OVERHANG
24"
DOUBLE UNIT RISE
Birds MOUTH

Figure 2.

LAYOUT FOR OVERHANG

DRAWING NUMBER
D-7-4

JOB: Make A Rafter Pattern

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 6 X 12

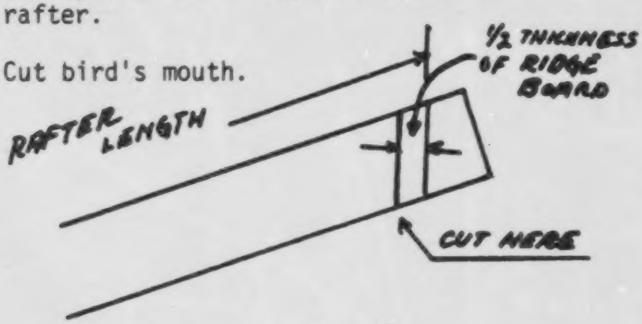
EQUIPMENT: Saw Horses
Portable Electric Saw

TOOLS: Framing Square
8 Point Hand Saw

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-5

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out rafter using either step-off or unit length method. Use 6-12 pitch building 19'-6" wide.	NOTE: Select straight piece of stock for pattern.
2. Lay out for bird's mouth.	
3. Lay out tail or overhang.	
4. Shorten rafter for ridge board. See sketch.	
5. Make plumb cut at top and bottom of rafter.	. SC-7-2
6. Cut bird's mouth.	NOTE: All layouts and cuts on any piece to be used for a pattern must be made with great accuracy.



METHOD OF EVALUATION:

Instructor will check the finished work.

JOB: Lay Out Ridge Board and Wall Plate For Rafters

JOB SHEET
IDENTIFICATION CODE

UNIT VII: Roof Framing

JOB NUMBER: J-7-6

COURSE: Carpentry

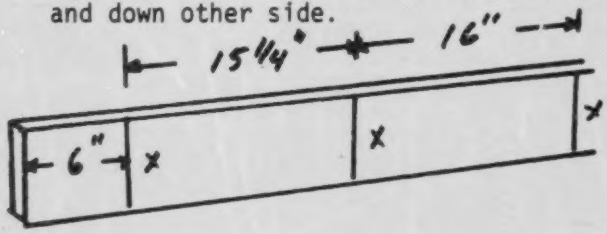
MATERIAL: Material will be listed by student

TOOLS: Framing Square
Steel Tape Rule

SAFETY PRECAUTIONS:

Observe all safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Examine the plan of the roof and determine the spacing of the rafters.	Example: Building 14' long 6" overhang at each end. Rafters spaced 16" C-C.
2. Lay off on the wall plate the required number of spaces by squaring lines across the plate.	
3. Mark an "X" on the side of each line where the rafter is to be nailed.	
4. Mark opposite wall from same end of building.	
5. Set the ridge board on edge on top of the rafter plate flush with one end of the building, then transfer the rafter spacing to the ridge board.	NOTE: If more than one piece is required for the ridge, joints must be made in the center of a rafter.
6. Square lines across top of ridge board and down other side.	If the gable end has an overhang, the ridge board should be allowed to extend beyond the end of the building, as required for the overhang. NOTE: If the ceiling joists have been installed, the rafters would be placed along side the joist, and the ridge board would be laid off to match the joist.



METHOD OF EVALUATION:

Instructor will inspect.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-7

JOB: Erect, Anchor and Brace a Gable Roof

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Specifications given by Instructor
Material Listed By Student

EQUIPMENT: Portable Saw
Saw Horses

TOOLS: Tool Kit

SAFETY PRECAUTIONS:

1. Remember to work carefully in high places.
2. Observe all on-the-job safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place the ridge board in position on top of the joist or on the scaffold.	NOTE: When the ridge board is made up of more than one length of stock, each section is usually erected separately and completely before moving to the next section.
2. Select straight rafters for the gable ends.	NOTE: On a steep roof it may be necessary to build a scaffold in order to erect the rafters. The platform should be approximately five feet from the top of the ridge. When working on top of ceiling joists, construct a catwalk to work on.
3. Nail the end rafter to the ridge board so the outside of the rafter is flush with the end of the ridge board. The top edge of the rafter should be even with the top of the ridge.	
4. Nail another rafter on the same side of the ridgeboard near the other end.	
5. Raise the ridge board and the rafters until the bird's mouth cut fits at the plate. Then toenail the rafters in place at the plate.	NOTE: This will require two workers.
6. On the opposite side of the ridge board, position two rafters near the end of the ridge board. These rafters should fit at the bird's mouth and the top end should rest against the ridge board.	
7. Toenail the rafters to the plate.	

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COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Raise or lower the ridgeboard until it is even with the rafters. Nail the rafters in position.	NOTE: The rafter at the joint in the ridge should be nailed in place so that half its thickness projects beyond the end of the ridgeborad. Only one rafter is nailed in place at the joint until the next section of ridge is in place.
9. Nail the remaining rafters of the section in place, alternating from side to side in order to keep the ridge straight.	NOTE: Always nail the bottom in place first, before positioning the top.
10. Nail a rafter to a mark near the end of the second piece of ridge board.	
11. Nail another rafter on the same side of the ridge near the center.	
12. Raise the second section and place the end of the ridge board tight against the end of the first piece of ridge board. Nail the bottom of the rafters to the plate.	
13. Sight along the second section to align it with the first; then nail the second section of ridge board to the rafter that centers on the joint.	
14. Erect several rafters on the opposite side of the ridge.	
15. Erect the remaining rafters alternately on both sides of the ridge.	
16. Plumb the end of the ridge with the plate on the end of the building, then brace the roof frame by nailing one end of a 2 x 4 brace to the ridge and the other end to a block spiked to the floor. (The plate on a center partition, if there is one.)	. SC-7-1
17. Nail rafters, place beside ceiling joists, to the joist with three or four 10d nails.	

METHOD OF EVALUATION:

The instructor will check the finished work.

JOB: Lay Out Rafter For Shed Roof

UNIT VII: Roof Framing

COURSE: Carpentry

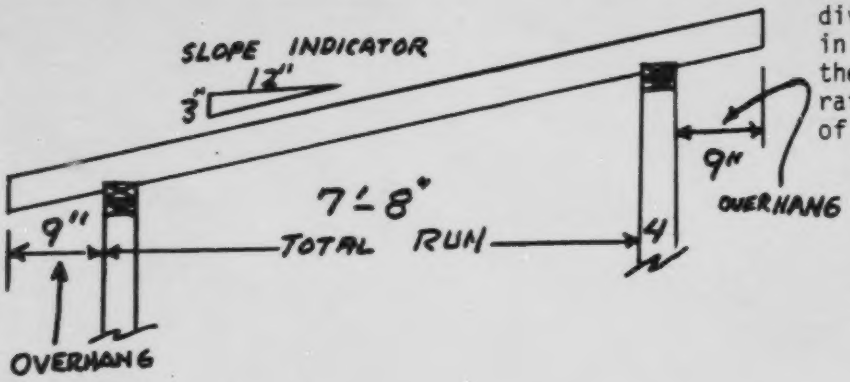
MATERIAL: See specifications on drawing attached

TOOLS: Framing Square

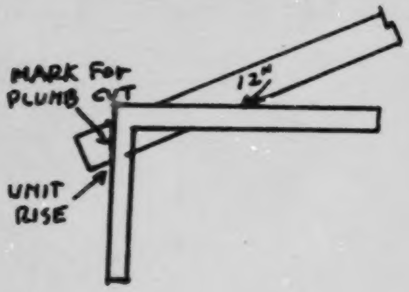
SAFETY PRECAUTIONS:

Observe general safety.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine rise and run of the rafter.	NOTE: Total rise is the difference between plate heights. This measurement divided by the number of feet in the run of the rafter gives you the unit rise. Total run of the rafter is measured to the inside of the plate of the high wall.

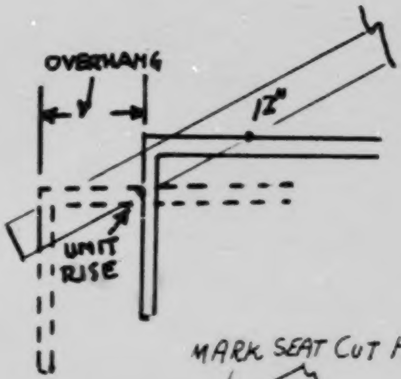


COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
2. Place the rafter on sawhorse or a bench with the crowned side away from you.	
3. Hold the framing square with the tongue in your left hand, the blade in your right and the open side of the square toward you.	
4. Beginning near the left end of the rafter (the bottom end), place the square on top of the rafter so that the unit rise on the tongue and the unit run (12") are located along the edge of the nearest rafter and marking along the tongue will mark the plumb cut for the lower end of the rafter.	NOTE: With the square in this position, we say it is laid to the "cut of the roof".

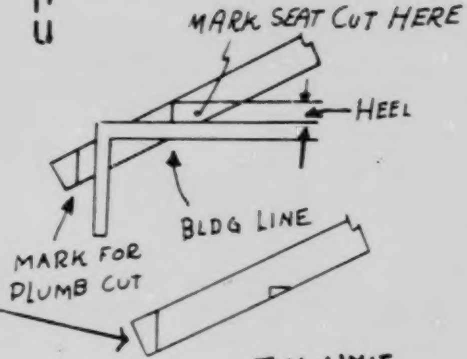


5. With the square still in the position described in Step #4, measure along the blade of the square the desired amount of overhang and mark the pint on the face of the rafter.

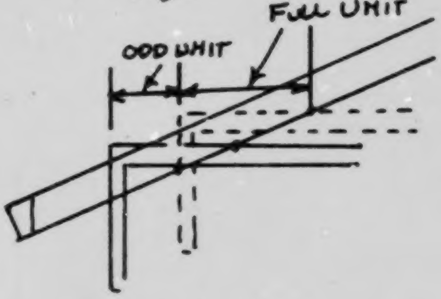
6. Slide the square up the rafter (still with the unit rise and unit run along edge of rafter) until the outside edge of the tongue is aligned with the mark made in Step #5 and mark along outside edge of tongue. This line indicates the outside of the building line.



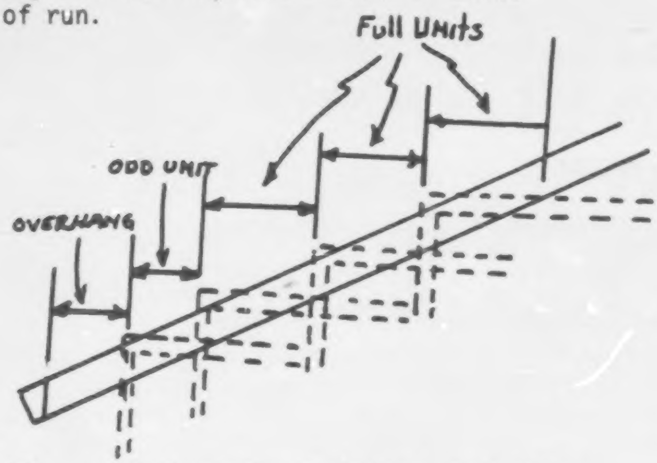
7. Lay out the heel dimension of the bird's mouth along the line marked in Step #6. Then, while holding the square to the "cut of the roof", slide the framing square down along the rafter until either side of the blade is aligned with the mark just made. Mark the seat cut of the bird's mouth at this point. The layout at this point should look like this.



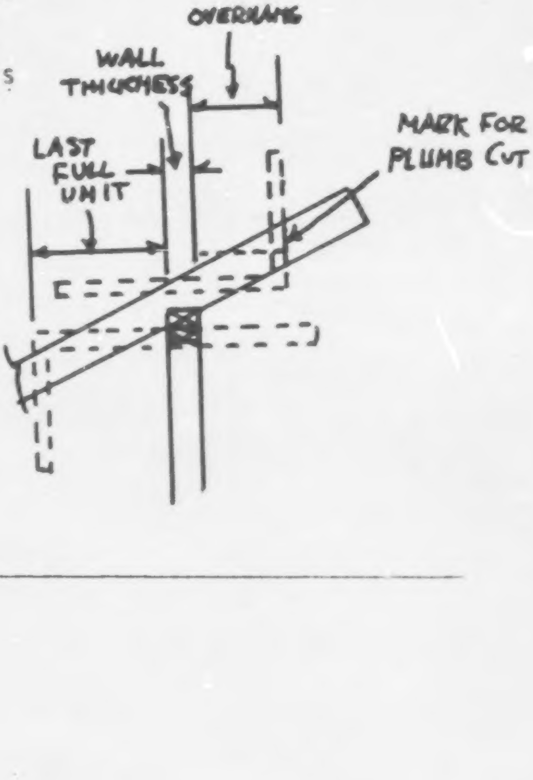
8. If this is an odd unit of run (less than 1'0"), lay it out next, by laying the square in position with the outside of the tongue aligned with the plumb cut of the bird's mouth and measuring along the blade the odd unit of run and marking the rafter at this point. Slide the square to align the outside of the tongue with the odd unit mark and mark along the blade at the 12" mark. An odd unit plus one full unit have been laid out.



9. Lay out the required number of units of run.


Full Units
ODD UNIT
OVERHANG

10. If on an independent building, lay off bird's mouth at top end of rafter, then lay out the overhang (projection), keeping in mind that the overhang will probably be indicated as a certain distance from the outside of the building, while your plumb cut on your bird's mouth is on the inside of the wall. If on a porch roof, no bird's mouth will be needed on the upper end of the rafter, as it will be framed against another wall. In this case, a plumb cut would be laid out.


OVERHANG
WALL THICKNESS
LAST FULL UNIT
MARK FOR PLUMB CUT

METHOD OF EVLAUATION:

Instructor will check the finished work.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-9

DRAWING NO: D-7-9

JOB: Lay Out, Cut and Install Gable Studding

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 2 Pieces, 2 X 4 X 7 Rafters
2 Pieces, 2 X 4 X 10 Plate
1 Piece, 2 X 4 X 12 Studs

EQUIPMENT: Portable Power Saw
Saw Horses

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

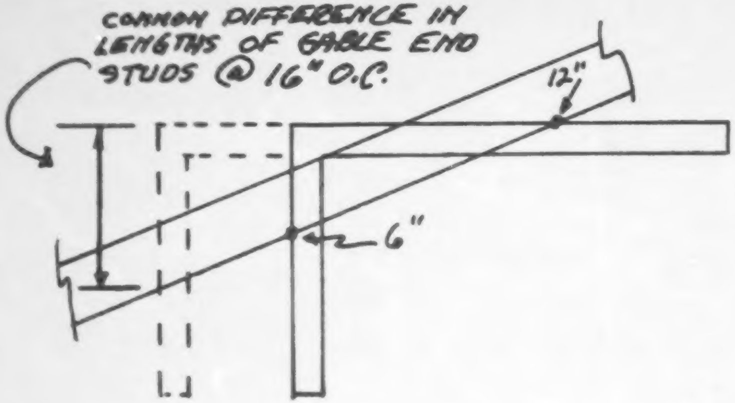
1. Be careful when working on scaffold and other high places.
2. Watch out for fellow workers below.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Plumb a line from either side of the ridge board to the wall plate and square a line across the plate at this mark. 2. Mark an "X" on the side of the mark which would cause the center stud to be installed under the ridge.	NOTE: The cut on the top end of a gable stud is the same as the plumb or top cut on the rafter. To mark for this cut hold the square with the figure 12 on the blade and the unit rise on the tongue. Mark along the tongue.
3. Lay out the stud spacing on the plate from this mark. (usually 16" or 24") 4. Cut the center stud to length, then toenail it in place. 5. Hold the blade of the framing square against the side of the center stud; then slide the square up or down the stud until the end of the tongue intersects the bottom edge of the gable rafter and square a line across the bottom edge of the rafter at this point. Mark an "X" on the upper side of the mark indicating where the stud will be placed (if 24" spacing is used, hold the tongue against the center stud).	NOTE: The common difference in length of studding on gable ends depends on two things: 1. the cut of the roof 2. the spacing of the studs If studs are spaced on 12" centers, then the common difference is equal to the unit rise. If studs are spaced 24" on center, then the common difference is twice the unit rise. If studs are spaced 16" on center, then the common difference is 1-1/3 times the unit rise.
6. Stand a stud upright on the first mark, against the side of the gable rafter and mark across the edge of the stud at the lower edge of the gable rafter.	NOTE: Cutting the top of the stud to allow the inner portion of the stud to run up the inside face of the rafter provides better nailing.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
7. Determine the common difference in the length of the studs for the spacing you are using.	NOTE: Each remaining stud will be this distance shorter than the preceding one.
8. Cut two studs of each length (one for each side of the gable), one right hand and one left hand.	
9. Nail the studs in position flush with the outside of the rafters and the plate.	NOTE: Be careful not to raise the rafter when nailing the upper end of the stud in place.

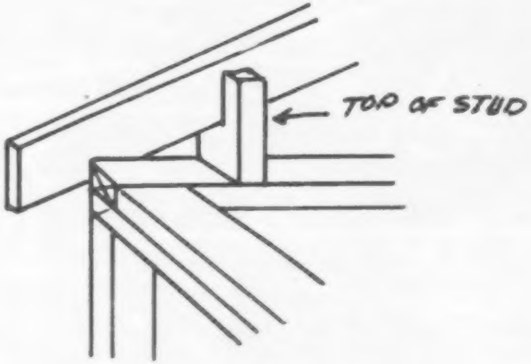
METHOD OF EVALUATION:

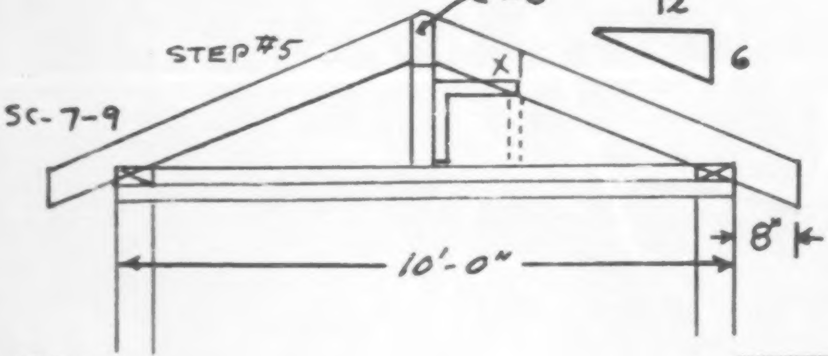
The instructor will inspect the finished work.


COMMON DIFFERENCE IN LENGTHS OF GABLE END STUDS @ 16" O.C.
12"
6"

TO FIND COMMON DIFFERENCE OF GABLE STUDS @ 16" O.C.

1. LAY SQUARE ON STOCK TO THE CUT OF ROOF (6-12)
2. MARK ALONG BLADE.
3. SLIDE SQUARE ALONG LINE MADE IN STEP #2 UNTIL THE 16" MARK IS ALLIGNED WITH THE EDGE OF THE STOCK.
4. READ COMMON DIFFERENCE.




2×6
STEP #5
SC-7-9
X
12
6
8"
10'-0"

Layout of Gable Studding

DRAWING NUMBER
D-7-9

JOB: Frame Opening for Louver in Gable End

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 2 X 4 Studs

EQUIPMENT: Portable Power Saw

TOOLS: Basic Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-10

SAFETY PRECAUTIONS:

Use care when working on ladders and scaffolds.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

To frame for a triangular louver: (Fig. 1)

1. Check the plans to determine the size of the rough opening.

2. Lay out and cut 2 X 4 plate for across the bottom of the opening, to lay out the end cuts to fit the rafter, place the framing square on the edge of the 2 X 4 with the 12 on the blade and unit rise on the tongue. Mark along the blade.

3. Nail the plate in place so it is level from end to end.

4. Lay out for studding as when framing a gable end.

5. Cut and install all studs.

To frame an opening for a square or rectangular louver: (Fig. 2)

1. Lay out for studding as when framing a gable end.

2. Measure 1/2 of the required opening on each side of the center.

3. Install all gable end studs which do not fall within the opening.

4. Lay out height of opening on studs next to opening.

COMPETENCE - PROCEDURE/STEPS TEACHING/LEARNING ACTIVITIES

5. Cut and install header and sub-sill between regular studs.
6. Lay out width of opening on header and sub-sill.
7. Cut and install studs at side of opening.
8 Cut and install cripple studs on regular spacing.

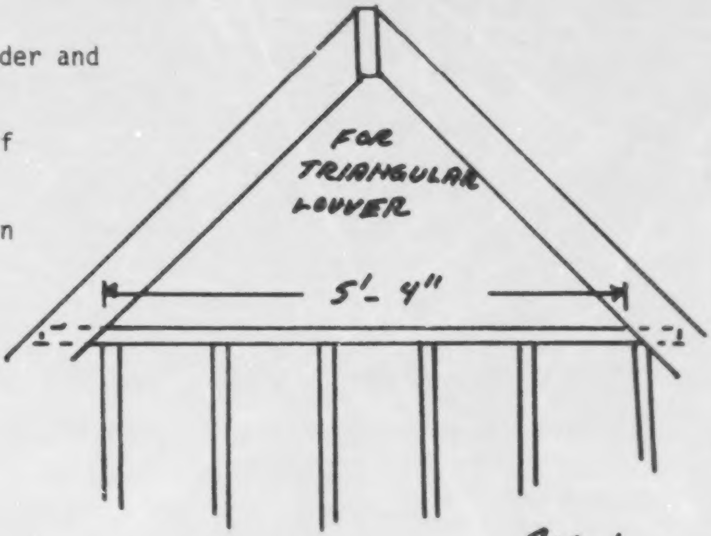


FIG-1

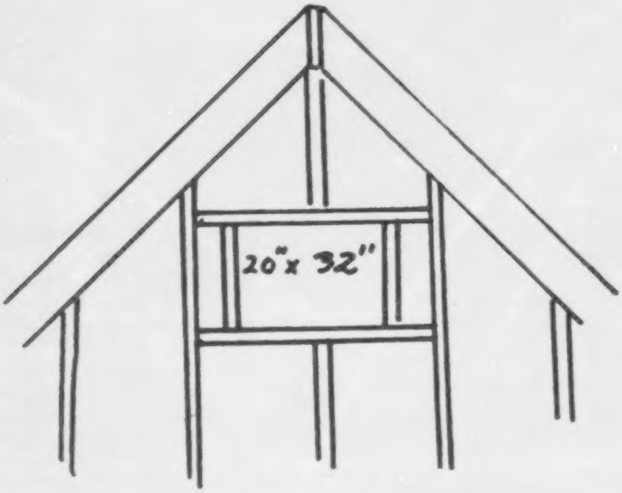


Fig-2

For Rectangular Louver

METHOD OF EVALUATION:

Instructor will check the finished work.

JOB: Frame a Shed Roof

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-11

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Rafters; Nails
Instructor will provide drawings and specifications

EQUIPMENT: Saw Horses; Portable Electric Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety when working at heights.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check top plates for alignment; align and brace, if necessary.	
2. Lay out plates to receive rafters.	. J-7-6
3. Determine rise and run of rafters.	. J-7-1, J-7-2
4. Determine tail or overhang needed for cornice.	. IL-7-3, IL-7-4
5. Lay out and cut rafter pattern.	. J-7-5, J-7-8
6. Mark and cut all rafters from pattern.	
7. Install rafters.	
8. Align and stay rafters.	. J-7-7
9. Install gable end studs.	. J-7-9

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
    a. cuts
    b. installation

JOB: Frame a Gable Roof

UNIT VII: Roof Framing

COURSE: Carpentry

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-12

MATERIAL: Rafters Studs
Ridge Board Nails
Instructor will provide drawings and specifications

EQUIPMENT: Saw Horses Portable Electric Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety--working at heights.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check top plates for alignment, straighten and brace if necessary.	
2. Lay out plates to receive rafters.	. J-7-6
3. Select material for ridge board and cut ridge boards to length.	. J-7-6
4. Lay out ridge board from plate.	. J-7-6
5. Determine rise and run of rafters.	
6. Lay out and cut rafter pattern.	. J-7-5
7. Mark and cut rafters from pattern.	
8. Fasten rafters to plate and ridge.	. J-7-7
9. Plumb and brace ridge board.	. J-7-7
10. Align and stay rafters.	
11. Install gable end studs.	. J-7-9

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
    a. cuts
    b. installation

JOB: Lay Out a Hip or Valley Rafter Using The Step Off Method

JOB SHEET IDENTIFICATION CODE

UNIT VII: Roof Framing

JOB NUMBER: J-7-13

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 6 X 12'

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Practice general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: The procedure described here applies primarily to hip rafters. However, valley rafters may be laid out using the same procedures. The only differences will be in the shortening at the top end, in the laying out of the cheek cuts, and in the cutting of the bird's mouth.
1. Determine the total run of the common rafter.	NOTE: You will make as many steps with the square as there are feet in the run of the common rafter. (Example: 7'8" = run of common rafter.) Hip rafter will require seven full steps and a fraction of another step.
2. Determine the unit rise.	Example: 6"
3. Place the rafter on sawhorses, face up, with the crowned side toward the student starting layout near the left end.	
4. Lay the framing square on the rafter stock with the tongue to the left and the open side toward the student.	
5. With the unit rise (6") on the tongue and the unit run (17" for hip rafters) align the blade with the nearest edge of the stock.	
6. Mark the top plumb cut along the outside of the tongue and lay off the odd unit of run (the diagonal of an 8" square or 11 5/6") along the blade. Mark the stock at the 11 5/16" mark.	

COMPETENCE - PROCEDURE/STEPS

7. Slide the square along the stock to the right, keeping the unit rise and unit run aligned with the edge of the stock, until the outside of the tongue is aligned with the odd unit mark made in step #6.

8. Mark the stock where the 17" mark on the blade and the edge of the stock meet.

9. Lay off as many full units of run as there are feet in the total run of the common rafter. (In this case, 7.)

10. When laying out the last full unit (the 17" mark indicates the building line), draw a plumb line at this point.

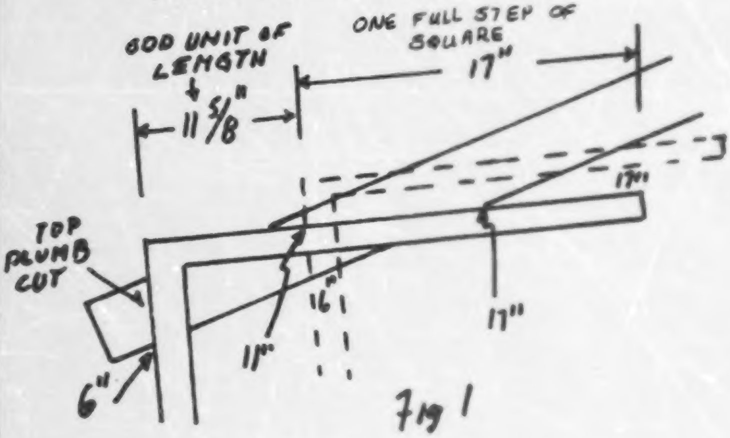


Fig 1

TEACHING/LEARNING ACTIVITIES

NOTE: You have now laid out:
- a. the plumb cut
- b. the odd unit of run (11 5/16")
- c. one full unit of run (17") Fig. 1

NOTE: In addition to the steps listed for laying out a hip or valley rafter, the following operations must be completed before the rafter is ready to be cut:

1. The rafter must be shortened for the ridge.
2. The cheek cuts must be laid out.
3. The overhang (or tail) must be laid out.
4. The rafter must be dropped (hip rafter only).

METHOD OF EVALUATION:

The instructor will:
1. check accuracy of layout.
2. observe student procedures.
3. orally question to check student's understanding of procedures.

JOB:	Lay Out a Hip or Valley Rafter Using the Unit Length Method	JOB SHEET IDENTIFICATION CODE
UNIT VII:	Roof Framing	JOB NUMBER: J-7-14
COURSE:	Carpentry	
MATERIAL:	Stock used in J-7-13	
TOOLS:	Framing Square	

SAFETY PRECAUTIONS:

Practice general safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine the total run of the rafter. (This will be the same as the run for the common rafter for the same roof. Example: 7' 8").	
2. Determine the unit rise of the rafter. (Example: 6")	
3. Lay off the plumb cut on the face of the rafter stock. The crowned edge must be on top when the rafter is in position.	
4. Find the rafter table on the framing square and locate the 6" mark on the outside edge of the rafter table. This represents the unit rise.	
5. Look along the line marked "length of hip or valley rafter per foot of run" until you come to the 6" mark. Under the 6" mark you will see the number 18. This represents the unit length or slope length of the hip or valley rafter for each foot of run.	
6. Multiply the slope length (18") times the number of units of run (7 2/3) to get the length of the rafter from the center of the building to the outside building line. (Example: 18 x 7.67 = 138.06" or 11' 6 1/16")	NOTE: Some carpenters prefer to lay out the odd unit of run using the step-off method (SC-7-14), especially when there are fractions of an inch involved in the odd unit. In addition to saving time, this method eliminates the possibility of error when using fractions.
7. Lay out this measurement along the top or bottom edge of the rafter from the plumb cut marked in step #3.	

8. Draw a plumb line on the face of the rafter stock at the point marked in step #7.

9. Before cutting the rafter, complete the following operations:
   a. Lay out the length of the rafter.
   b. Lay out the cheek cuts.
   c. Lay out the overhang, or tail.
   d. For hip rafter only, drop rafter.

NOTE: Valley rafters may be laid out using the same procedures described here for hip rafters. The only differences will be in the shortening at the top end, in the laying out for the cheek cuts, and in the cutting of the bird's mouth.

METHOD OF EVALUATION:

The instructor will:
1. check layout for accuracy.
2. orally question the student on calculations of the total length.
3. observe for proper procedures.

JOB: Drop a Hip Rafter

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 6 X 3'

TOOLS: Framing Square

SAFETY PRECAUTIONS:

General safety practice.

JOB SHEET
IDENTIFICATION CODE

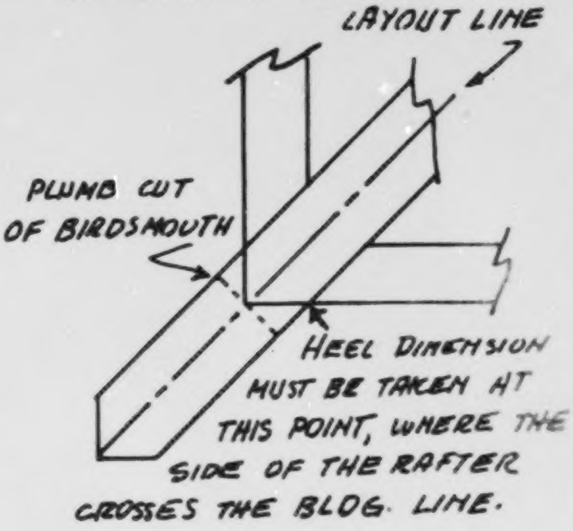
JOB NUMBER: J-7-15

SKILL COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Draw a plumb line on the face of the hip rafter indicating the building line.
2. Measure in at right angle to the plumb line a distance equal to one-half the thickness of the hip rafter.
3. Draw a new plumb line at the point marked in step #2.
4. Lay off the heel dimension (same as the heel dimension on the common rafters for the same roof) along this new plumb line from the top edge of the rafter.
5. Hold the square to the "cut of the roof" and slide the framing square along the rafter until either side of the blade is aligned with the mark made in step #4.
6. Mark the seat cut of the bird's mouth along the blade.

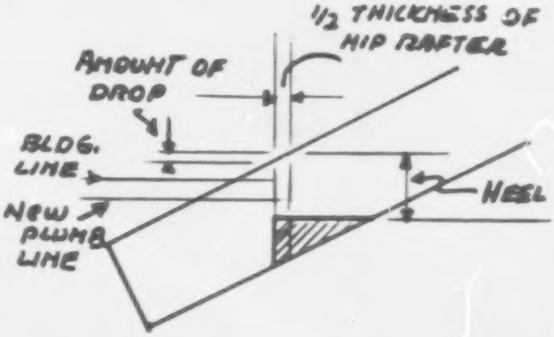
TEACHING/LEARNING ACTIVITIES

NOTE: The seat cut on a bird's mouth of a hip rafter must be laid out so that its height at the point where the edge of the hip rafter crosses the plate line is equal to the heel dimension of the bird's mouth on the common rafter.


LAYOUT LINE
PLUMB CUT OF BIRDSMOUTH
HEEL DIMENSION MUST BE TAKEN AT THIS POINT, WHERE THE SIDE OF THE RAFTER CROSSES THE BLDG. LINE.

7. Lay out the following plumb lines and lay out for drop.

Plumb line for:	Heel dimension on common rafter
8 - 12 slope	5"
6 - 12 slope	4 1/2"


1/2 THICKNESS OF HIP RAFTER
AMOUNT OF DROP
BLDG. LINE
NEW PLUMB LINE
HEEL

8. Lay out drop on hip rafter as in J-7-14.

NOTE: Have all work checked.

METHOD OF EVALUATION:

Instructor will:

1. check for accuracy.
2. observe and question orally.

JOB: Lay Out Overhang for Hip or Valley Rafter

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Material will be listed by student

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-16

DRAWING NO: D-7-16

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

Lay out for the overhang on a hip rafter using the unit length method:

1. Draw a plumb line indicating the building line and square a line across the top edge of the rafter at this point.
2. Multiply the number of units of cornice projection by 17.44" (unit length of hip rafters for a 4/12 slope).
3. Measure this distance along the top edge of the rafter from the line marked in step #1.
4. Square a line across the top edge of the rafter at this point and locate the center point on this line. This will locate the long point of the bevel cuts to be made on the end of the rafter.

Lay out the overhang (tail) on a hip rafter using the step-off method.

1. Mark a plumb line indicating the building line.
2. Lay off one full unit using 4" and 17" on the square.
3. Lay off the odd unit of run (4" on the common rafter equals 5 5/8" on the hip). See Fig. 1
4. Mark a plumb line at this point and square a line across the top edge of the rafter and locate the center point on this line. This will locate the long point of the bevel cuts.

NOTE: The overhang, or tail, of the hip rafter will have the same number of units of run as the common rafter for the same roof. Remember, however, that the hip rafter travels at a 45° angle so its actual run is equal to the diagonal of a square having as its sides an amount equal to the run of the tail on the common rafter. See Fig. 1.

Example: Projection of common rafters - 1' 4"

Roof slope = 4 in 12

17.44 x 1.33 (units of run) = 23.20" or 1' 11 3/16" (slope length of the overhang

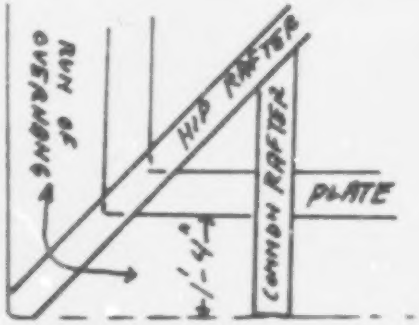


Fig. 1.

275

Lay out the overhang on a valley rafter:

1. Lay out a plumb line on the side of the valley rafter at a point where it crosses the plate.
2. Lay out the length of the overhang using either the unit length method or the step-off method.
3. Draw a plumb line at the tail end of the rafter.
4. Measure back from the plumb line at right angle a distance equal to one half the thickness of the valley rafter.
5. Establish another plumb line at the point marked in step #4 and square a line across the top of the valley rafter at this point and locate the center point on this line.
6. Connect the outside points of the first plumb line to the center point marked in step #5.
7. Cut out the tail as shown. (Fig. 3).

NOTE: The overhang on a valley rafter is laid out in much the same manner as the overhang on the hip rafter. The one big difference is in the way the bevel cuts are laid out on the lower end of the rafter. Fig. 2. shows the bevel cuts on the hip rafter and Fig. 3 shows the bevel cuts on the valley rafter.

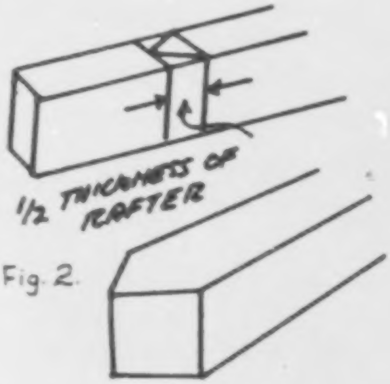


Fig. 2.

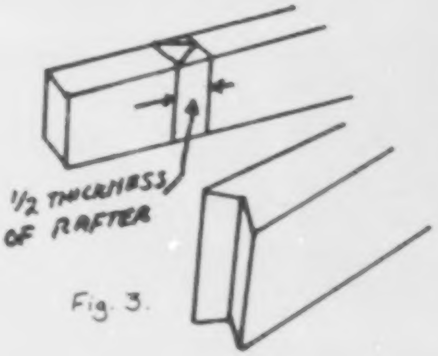
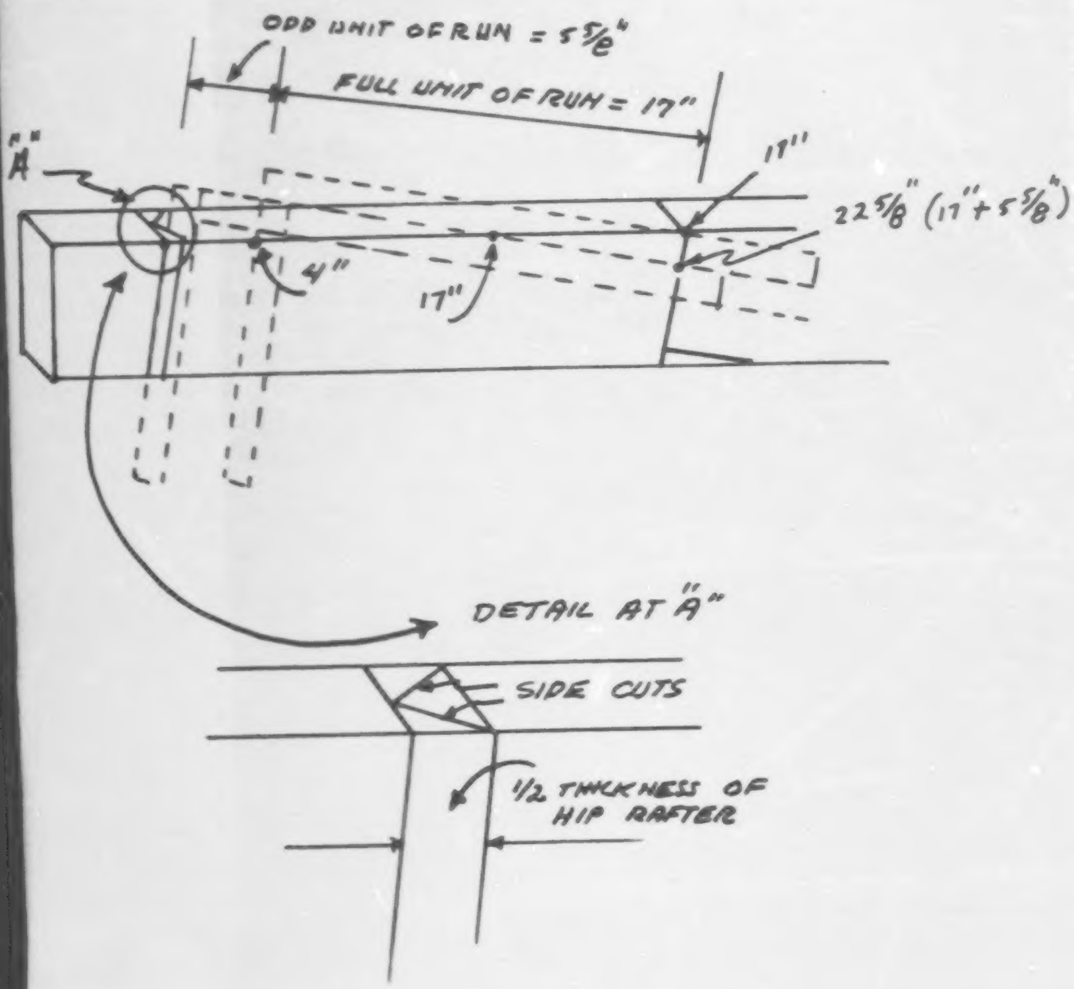


Fig. 3.

METHOD OF EVALUATION:

The instructor will check the finished work.


ODD UNIT OF RUN = 5 5/8"
FULL UNIT OF RUN = 17"
"A"
17"
22 5/8" (17" + 5 5/8")
4"
17"
DETAIL AT "A"
SIDE CUTS
1/2 THICKNESS OF HIP RAFTER

Overhang Layout

DRAWING NUMBER
D-7-16

JOB: Shorten Hip Rafter At Ridge

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 1 Piece, 2 X 6 X 3'

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Develop general safety attitude.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-17

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

When hip rafters are framed against the ridge board as in Fig. 1, shorten one-half the diagonal thickness of the ridge to allow for the ridge board.

1. Lay off at right angle to the plumb line an amount equal to one-half the diagonal thickness of the ridge.
2. Draw a new plumb line through this mark.
3. Square a line across the top edge of the rafter at this point and locate the center point on this line.
4. Draw a line through the point marked in step #3 to mark the bevel or cheek cut.

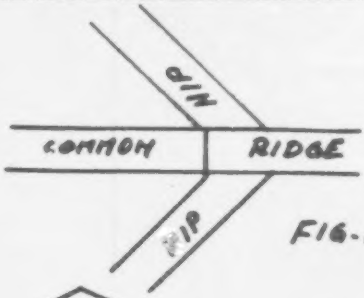


FIG-1

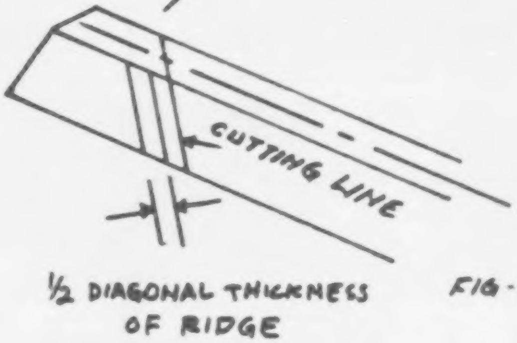


FIG-2

When hip rafters are framed against common rafters as in Fig. 3, shorten the hip rafters one-half the diagonal thickness of the common rafters.

1. Lay off at right angle to the plumb line an amount equal to one-half the diagonal thickness of the common rafter.
2. Draw a new plumb line through this mark.
3. Square a line across the top edge of the rafter at this point and locate the center point on this line.

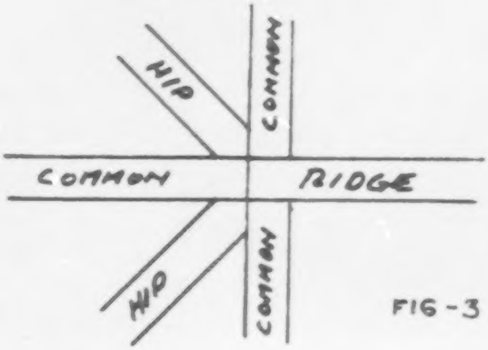
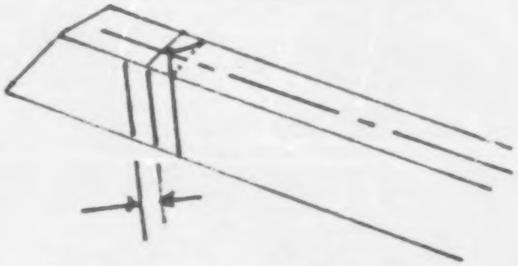


FIG-3



½ DIAGONAL THICKNESS
OF COMMON RAFTER FIG. 4

NOTE: This point locates the long point of the double half bevel which will be cut on the top end of the rafter.

METHOD OF EVALUATION:

The instructor will:
1. check student's work for accuracy.
2. question student on procedures used.
3. observe student's work.

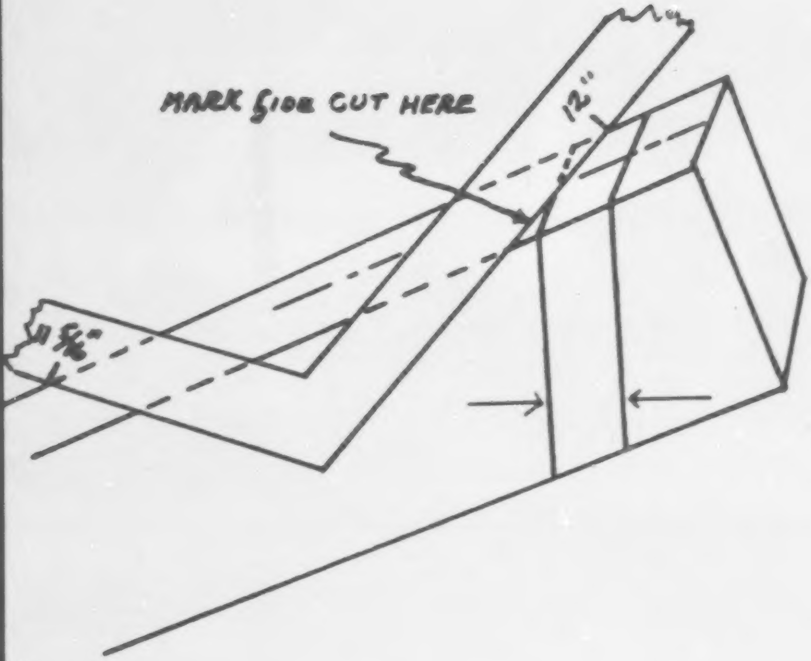
JOB:	Lay Out Side or Cheek Cuts on Hip, Valley or Jack Rafters	JOB SHEET IDENTIFICATION CODE
UNIT VII:	Roof Framing	JOB NUMBER: J-7-18
COURSE:	Carpentry	
MATERIAL:	1 Piece, 2 X 6 X 3'	
TOOLS:	Framing Square	

SAFETY PRECAUTIONS:

Always be safety conscious.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Locate the unit rise along the outer edge of the rafter table (in this case, 6"). 2. Look under the six on the line marked "side cut of hip or valley, use" and find the number 11-5/16. 3. Lay the square on the edge of the stock with 12 on the blade and 11-5/16 on the tongue aligned with the side of the stock. 4. Move the square along the stock until the edge of the blade passes through the center point found when shortening the rafter to allow for the ridge. 5. Mark along the blade. 6. Mark the opposite cheek cut, if necessary, in the same manner.	To locate the numbers to be used on the framing square to lay out for the cheek or side cuts, look on the sixth line of the rafter framing tables, marked "side cut of hip or valley rafter, use:. Look along this line until you come to the inch mark along the outside edge of the table which represents the unit rise. The number given will be used along with 12 to lay out the side cuts at the upper and lower ends of the hip and valley rafters. Example: Unit rise = 6".
7. Lay out side cuts on the bottom end of the rafters in the same manner.	NOTE: To lay out the side cuts on jacks, use the fifth line of the rafter table marked "side cuts of jacks use" and mark in the same manner.

NOTE: Two numbers are used to lay out the side or cheek cut. They are 12 and the number given in the table. Always mark on the 12 for side cut of hip, valley or jack.



METHOD OF EVALUATION:

The instructor will:

1. check student's work for accuracy.
2. question student's procedures.
3. observe student's use of the framing square.

JOB: Lay Out Hip or Valley Jack Rafters

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Rafter Stock for Practice

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Always look out for your fellow worker.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-19

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

Lay out a jack rafter using the shortest jack method:

1. Determine the run of the shortest jack rafter. This will be equal to the measurement from the end of the rafter plate to the center of the first jack rafter.
2. Lay out the plumb cut (unit run and unit rise as for common rafters).
3. Lay out the side or cheek cut.
4. Lay out the length of the jack rafter using either the unit length method or the step off method.
5. Lay out the bird's mouth.
6. Lay out for the overhang and tail cut.
7. Shorten the layout for one-half the diagonal thickness of the hip rafter.
8. Lay out the length of the second jack rafter using the length of the first jack rafter plus the common difference measurement found on the framing square.
9. Lay out each additional jack rafter which will be longer than the preceding one by an amount equal to the common difference measurement.

Lay out a hip jack rafter using the "longest jack method":

1. Determine the run of the longest jack which is equal to the measurement from the end of the rafter plate to the center of the longest jack rafter.

TEACHING/LEARNING ACTIVITIES

NOTE: The procedures listed are those for a hip jack rafter. The procedure for laying out a valley jack rafter is very much the same as that for a hip jack rafter except that:

1. There is no bird's mouth cut.
2. There is no overhang.
3. Valley jacks do fit against the ridge so there is a ridge cut.
4. Valley jack rafters must be shortened at both ends to allow for the thickness of the ridge and the valley rafter.

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
2. Lay out the plumb cut at the top end.	NOTE: Use the unit run and unit rise of the common rafter.
3. Lay out the side or cheek cut.	
4. Lay out the length of the jack rafter using either the unit length method or the step-off method.	
5. Lay out the bird's mouth.	
6. Lay out for overhang and tail cut.	
7. Shorten the layout by taking one-half the diagonal thickness of the hip rafter.	
8. Determine the length of the second longest jack rafter using the length of the first jack rafter minus the common difference measurement found on the framing square.	
9. Lay out each additional jack rafter which will be shorter than the preceding one by an amount equal to the common difference measurement.	

METHOD OF EVALUATION:

The instructor will:
1. check accuracy of layout.
2. check procedures.
3. observe and question orally.
4. give a performance test.

JOB: Lay Out a Cripple Jack Rafter

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Rafter Stock

TOOLS: Framing Square

SAFETY PRECAUTIONS:

Keep job site clean of debris and in order for safety's sake.

JOB SHEET
IDENTIFICATION CODE

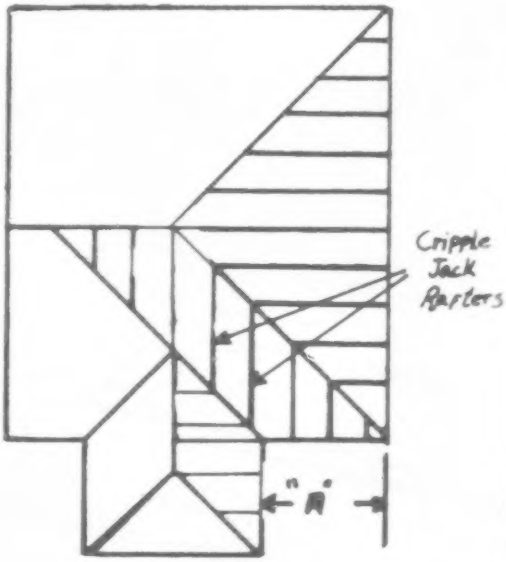
JOB NUMBER: J-7-20

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Determine the run of the hip-valley cripple jacks. This will be equal to the distance from the plate corner to the center line of the valley rafter (A).
2. Determine the line length of the hip-valley cripple jacks by multiplying the common rafter unit length by the number of units of run of the cripple jack rafter.
3. Lay off the line length along the top edge of the hip valley cripple jack.
4. Square lines across the edge of the rafter through the layout marks and establish plumb lines on the side of the rafter.
5. Shorten the cripple jack to allow for the thickness of the hip and valley rafters (one half the diagonal thickness of the hip and valley rafters laid off at right angle to the plumb lines).
6. Lay out side cuts parallel to each other on both ends. The side or cheek cut is laid out the same as on other jack rafters.

TEACHING/LEARNING ACTIVITIES

NOTE: The line length of the cripple jack rafters may also be determined using the step-off method. Use the unit rise and unit run of the common rafter and step off one unit for each foot of run covered by the cripple jack rafter.



JOB: Lay Out Ridge Board For a Hip Roof

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Ridge Board Stock (One Size Larger than Rafter;
Ex.: 2 X 6 Rafters - 2 X 8 Ridge)

TOOLS: Framing Square

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-21

SAFETY PRECAUTIONS:

Watch out for falling objects while working under scaffolds.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Find the theoretical length of the ridge by subtracting the width of the building from the length of the building.	
2. If the hip rafters are framed at the ridge as shown in Fig. 1, add one half the thickness of the common rafter at each end of the ridge.	
3. If the hip rafters are framed at the ridge as in Fig. 2, add one half the thickness of the ridge plus one half the diagonal thickness of the hip rafter to each end of the ridge.	

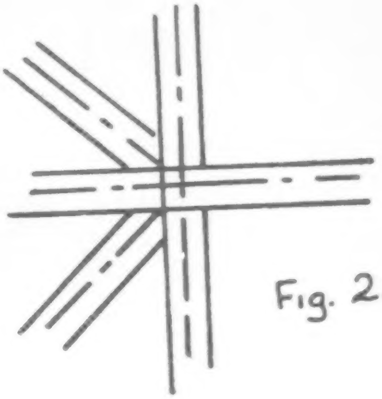
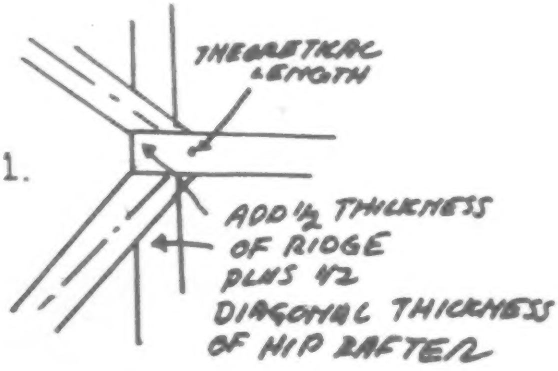


Fig. 2.

Fig. 1.



THEORETICAL LENGTH
ADD ½ THICKNESS OF RIDGE PLUS ½ DIAGONAL THICKNESS OF HIP RAFTER

METHOD OF EVALUATION:

The instructor will:
1. observe and question orally.
2. check accuracy of work.
3. check accuracy of layout.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-22

JOB: Frame a Hip Roof

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Rafters Nails Ridge Board
Instructor will provide drawings and specifications

EQUIPMENT: Saw Horses
Portable Electric Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety--working at heights.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check plates for alignment on all sides. Align and brace, if necessary.	
2. Lay out plates to receive rafters.	. J-7-6
3. Select material for ridge board. Lay out and cut to length. Lay out to receive rafters.	. J-7-6
4. Determine rise and run of common rafters.	
5. Lay out and cut common rafter pattern.	. J-7-1 through J-7-5
6. Mark and cut all common rafters from pattern.	
7. Erect common rafters, including one at the center of each end.	. J-7-7
8. Lay out and cut hip rafters.	. SC-7-3
9. Erect hip rafters.	
10. Lay out, cut and install jack rafters.	. J-7-19
11. Align and stay rafters.	

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
   a. cuts
   b installation

JOB: Lay Out a Ridge Board for an Intersecting Roof

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: As provided by instructor

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-23

SAFETY PRECAUTIONS:

Make sure power tools are properly grounded especially when used in wet or damp areas.

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

1. Determine the theoretical length of the ridge on an intersecting roof with a gable end by adding the length of the rafter plate on the addition to the run of the common rafter of the addition.
2. Determine the true length of the ridge on the intersecting roof when the span of the addition is equal to the span of the main building by subtracting one-half the thickness of the ridge of the main roof. See Fig. 1.
3. When the span of the addition is smaller than that of the main roof, determine the true length of the intersecting roof ridge which is equal to the length of the rafter plate of the addition plus the run of the common rafter of the addition minus one-half the diagonal thickness of the supporting valley rafter. See Fig. 2.
4. Determine the length of a ridge board on an intersecting hip roof which is equal to the length of the rafter plate of the addition.

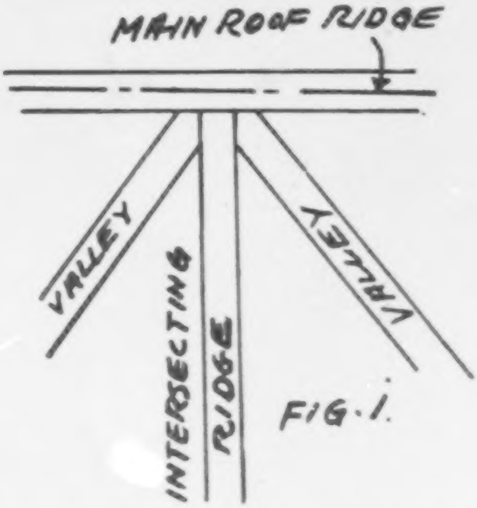


FIG. 1.

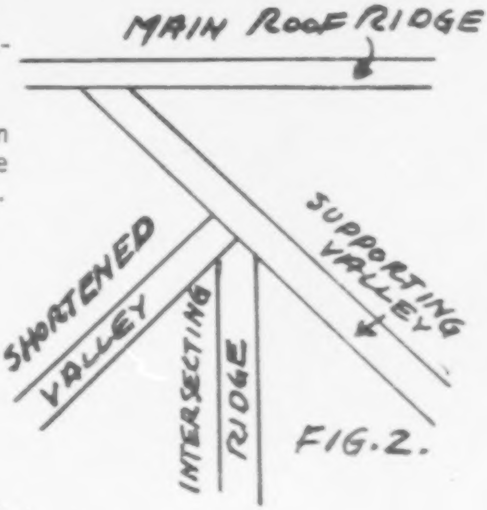


FIG. 2.

METHOD OF EVALUATION:

The instructor will check the finished work.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-24

JOB: Lay Out Collar Beam

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: As provided by instructor

SAFETY PRECAUTIONS:

Always use protective devices such as goggles and respirators when required.

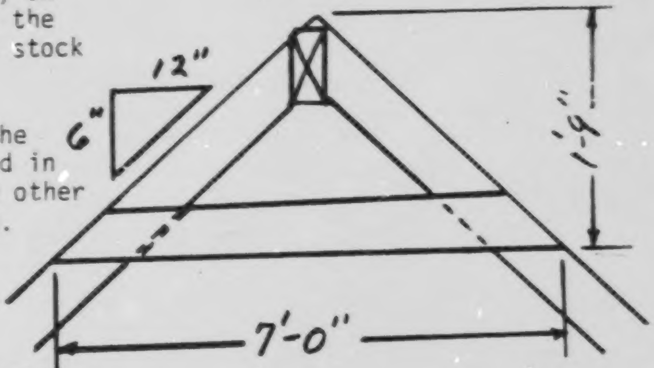
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Locate the level at which the bottom of the collar beam will be placed.
2. Determine the distance from the bottom of the collar beam to the peak of the roof.
3. Convert the measurement from step #2 (1'-9") into a number of units of rise.

   1'-9" divided by 6 (unit rise) = 3.5
4. Multiply 3.5 x 24" = 84" or 7'-0".
5. Layout the angle cut on the end of the collar beam by placing the framing square on the stock with the unit run (12") on the blade and the unit rise (6") on the tongue aligned with the edge of the stock and mark along the blade.
6. Measure from the long point along the edge of the stock the distance found in step #4 and lay out an angle on the other end opposite to that already marked.
7. Lay out another collar beam for a 4-12 sloped roof with the bottom of the collar beam placed 2'-2" from the roof peak.

NOTE: The length of the collar beam will depend on the distance it is placed vertically below the roof peak. Its length will be 24" for each unit of rise.

Example: Unit rise = 6"
Distance from bottom of collar beam to roof peak = 1'-9"



METHOD OF EVALUATION:

The instructor will:
1. check accuracy of layout.
2. observe and question orally.

JOB: Frame an Intersecting Roof

JOB SHEET
IDENTIFICATION CODE

UNIT VII: Roof Framing

JOB NUMBER: J-7-25

COURSE: Carpentry

MATERIAL: Rafters Nails Ridge Board
Instructor will provide drawing and specifications

EQUIPMENT: Portable Electric Saw Saw Horses

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety when working at heights.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check plates for alignment on all sides. Align and brace, if necessary.	
2. Lay out plates to receive rafters.	. J-7-6
3. Lay out and cut ridge boards for main roof to length and lay out to receive rafters.	. J-7-6
4. Lay out and cut common rafter pattern for main roof.	. J-7-1 through J-7-5
5. Mark and cut common rafters for main roof from pattern.	
6. Locate the point on the main roof where the supporting valley rafter will tie into the main roof.	
7. Erect ridge and common rafters on main roof, leaving room for the supporting valley rafter.	. J-7-7
8. Lay out, cut and erect supporting valley rafter.	. J-7-13 to J-7-16
9. Lay out, cut and erect shortened valley rafter.	
10. Lay out and cut rafter pattern for intersecting roof.	. J-7-5

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
11. Mark and cut common rafters for intersecting roof.	
12. Lay out and cut ridge board for intersecting roof and lay out to receive rafters.	. J-7-6
13. Erect ridge and common rafters on intersecting roof.	. J-7-7
14. Lay out, cut and install jack rafters on intersecting roof.	. J-7-13 to J-7-18
15. Lay out, cut and install jack rafters on main roof.	. J-7-19
16. Lay out, cut and install cripple jacks.	. J-7-20

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
    a. cuts
    b. installation

JOB: Lay Out Gambrel Roof Rafters

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: As provided by instructor

EQUIPMENT: Portable Power Saw

TOOLS: Framing Tools

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-26

SAFETY PRECAUTIONS:

Practice safety to prevent damage to tools and equipment as well as bodily injury.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine the total run of the lower slope.	Example: 4'-0"
2. Determine the unit rise of the lower slope.	Example: 24" NOTE: The length of the plumb cut will be equal to the depth of the purlin.
3. Lay out the seat cut as shown in Fig. 1. along the tongue of the square.	
4. Step off four units of run.	
5. Lay out the cut at the purlin as in Fig. 2.	
6. Determine the total run of the upper slope. See Fig. 2.	
7. Determine the unit rise of the upper slope.	
8. Lay out the cut at the purlin as shown in Fig. 2.	
9. Step off the required number of units of run.	
10. Lay out the plumb cut at the ridge.	
11. Shorten the rafter one half the thickness of the ridge.	

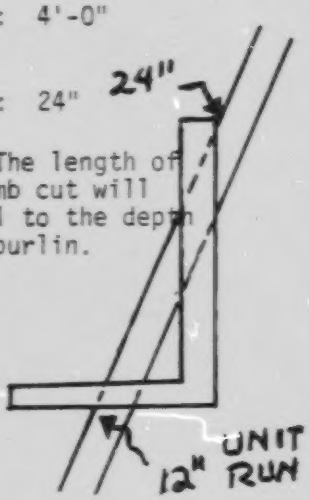


FIG-1

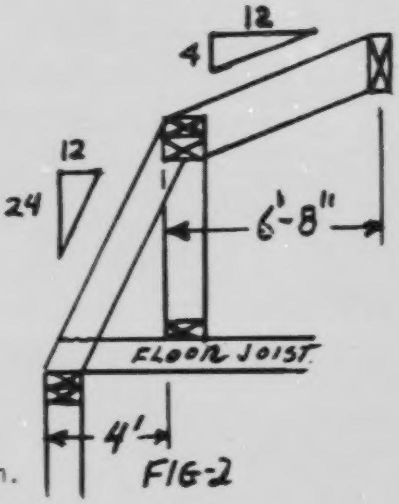


FIG-2

METHOD OF EVALUATION:

The instructor will:

1. check accuracy of layout against a pattern.
2. observe and question orally.

JOB: Frame Opening In a Roof

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Provided by Instructor

EQUIPMENT: Portable Power Saw

TOOLS: Framing Tools

JOB SHEET IDENTIFICATION CODE

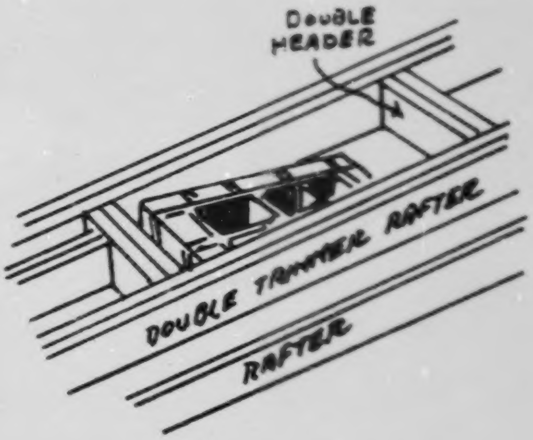
JOB NUMBER: J-7-27

SAFETY PRECAUTIONS:

Be careful while using power tools in awkward and difficult places such as on a building frame.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Lay out the width of the opening on the rafter plate and on the ridge.
2. Install a rafter at each side of the opening.
3. Lay out plumb lines on the inside faces of the rafters indicating the position of the headers.
4. Cut and install the outside headers.
5. Cut and install the tail rafters (rafters which are cut to fit against and are supported by the headers).
6. Cut and install the inside headers.
7. Cut and install the double rafters.



METHOD OF EVALUATION:

The instructor will:
1. check dimensions and location of finished opening.
2. check nailing procedures.
3. observe and question orally.
4. check sequence of installation.

JOB: Frame A Cantilever Gable End Rafter

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: As provided by Instructor

EQUIPMENT: Portable Power Saw

TOOLS: Framing Tools

SAFETY PRECAUTIONS:

Observe safety rules for working in high places.

JOB SHEET
IDENTIFICATION CODE

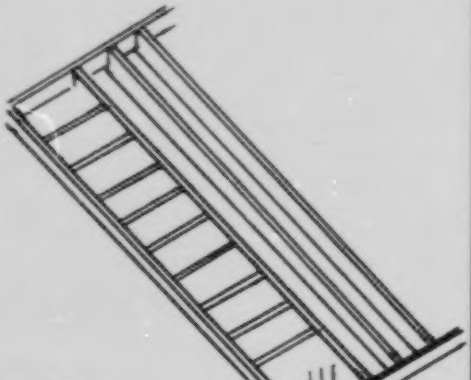
JOB NUMBER: J-7-28

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Check the cornice details to determine the dimensions of the rake cornice and the width of the end rafter and the lookouts.
2. Rip sufficient material for the rafters and the lookouts.
3. Cut the ridge board which extends beyond the wall line to width so its bottom edge does not extend below the bottom edge of the end rafter or lookouts. A straight edge placed against the bottom edge of the end rafter should hit the center point of the ridge.
4. Cut the ridge board and the sub-fascia to length. (This may have been done when they were installed.)
5. Select straight stock for the end rafter and use the common rafter pattern to lay out the top and bottom plumb cuts (no bird's mouth).
6. Determine length of the lookouts by measuring from the end of the ridge to the layout mark for the first regular rafter and subtracting from this measurement the thickness of the end rafter.
7. Cut lookouts to length.
8. Lay out for the lookouts on 16" centers on both the end rafter and the first regular rafter.

TEACHING/LEARNING ACTIVITIES

NOTE: When framing a cantilevered roof rake, the top of the gable end framing must be framed with a top plate having its top surface even with the bottom of the rake framework. This will serve as a support for the lookouts which in turn support the end rafter. This can be done by setting a temporary rafter at the gable end. If the cantilever framing is 2 X 4, the temporary rafter should be 2 X 4. Then frame the gable end to the bottom of this temporary rafter. The temporary rafter is then removed to build the cantilever frame.



COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
9. Assemble the two rafters and the lookouts keeping the lookouts even with the top edge of both rafters.	
10. Hoist the assembly into position and fasten to the ridge board and the subfascia.	
11. Sight the outer edge of the end rafter for straight and straighten and brace until the roof sheathing is applied.	
12. Toe nail the lookouts to the top plate of the gable end framework after making sure it is plumb.	

METHOD OF EVALUATION:

The instructor will:
1. check accuracy of student's work.
2. observe and question orally.
3. check adherence to safety rules.

JOB: Install Plywood Roof Sheathing

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 5/8" X 4' X 8' Sheathing Grade Plywood

EQUIPMENT: Portable Power with Carbide Tipped Blade

TOOLS: Framing Tools

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-29

SAFETY PRECAUTIONS:

1. Use care in handling heavy bulky material.
2. Large sheets of plywood are a hazard on windy days; they can be blown off of a roof or cause someone to be thrown off.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Erect the necessary scaffold to install the sheathing along the lower edge of the roof.	NOTE: Almost all plywood used for sheathing will measure 48" X 96". It is applied with the face grain running at right angle to the rafters. All end joints are placed over the center of the rafter and are staggered in adjoining rows. The exterior walls must be straightened and braced before the roof sheathing is installed.
2. Lay out and attach a stay strip across the top edge of the rafters about half way between the ridge and the plate. This will hold the rafters in line until the sheathing is nailed in place.	
3. Strike a chalk line across the top edge of the rafters from one end of the building to the other to indicate the location of the top edge of the first row of panels.	
4. Place the first piece of sheathing so one end is on or beyond the end rafter and the other end is centered on a rafter and nail in place when the upper edge is aligned with the chalk line.	
5. Continue nailing across the roof making sure that the top edge of the panels are aligned with the chalk mark and that the end of the panel falls in the center of a rafter.	
6. Cut a panel as needed to finish the first row and if possible use the remainder of the panel to start the second row.	
7. Continue to apply the panels in rows until you get near the ridge.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Rip panels as needed to have the top edge of the last row fall in the center of the ridge.	
9. Apply plywood sheathing to the opposite side of the roof in the same manner.	
10. Strike a chalk line from bottom to top at the ends of the building to indicate where the sheathing will be cut off.	NOTE: When installing plywood sheathing on hip roofs the plywood panels are applied in much the same manner as on gable roofs. The ends of the panels are allowed to extend beyond the hip rafters and are cut off later with a portable circular saw. The pieces that are cut off will in most cases be used on the adjacent slope.
11. Cut off the sheathing to this line.	

METHOD OF EVALUATION:

The instructor will:
1. check student's procedures.
2. check application and nailing procedures.
3. observe and question orally.
4. check adherence to safety rules.

JOB: Frame a Gambrel Roof

UNIT VII: Roof Framing

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-30

MATERIAL: Rafters Nails Ridge Board
Instructor will provide drawings

EQUIPMENT: Saw Horses Portable Electric Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety when working at heights.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check top plates for alignment and brace if necessary.	
2. Lay out plates to receive rafters.	. J-7-6
3. Lay out and cut ridge board to length and lay out ridge to receive rafters.	. J-7-6
4. Lay out and cut purlins to length. Erect, align and brace purlins and lay out to receive rafters.	
5. Lay out and cut rafters for lower slope.	. J-7-5
6. Fasten rafters on lower slope to plate and purlin.	. J-7-7
7. Lay out and cut rafters for upper slope.	. J-7-5
8. Fasten rafters on upper slope to purlin and ridge.	. J-7-7
9. Plumb and brace roof frame.	. J-7-7
10. Align and stay rafters.	

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
    a. cuts
    b. installation

JOB: Install Solid Board Sheathing

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: As required by drawings and specifications

EQUIPMENT: Portable Saw

TOOLS: Framing Tools

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-31

SAFETY PRECAUTIONS:

Be careful with power tools when working on scaffolds or the roof frame.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Erect the necessary scaffold to install the first several rows of sheathing boards along the bottom edge of the roof.	NOTE: Common boards used for roof sheathing are commonly 6", 8" or 10" wide. They are applied at right angle to the rafters with end joints falling in the center of a rafter.
2. Lay out and attach a stay strip across the top edge of the rafters about half way between the ridge and the plate. This will hold the rafters in line until the sheathing is nailed.	The exterior walls must be straightened and braced before starting to apply roof sheathing.
3. Select straight, good quality boards for the first row.	When placing roof sheathing, four or five boards may be allowed to splice on the same rafter before staggering in order to speed up the job of installing roof sheathing.
4. Apply the first row of sheathing the full length of the building.	NOTE: The bottom edge should be straight and should extend beyond the lower end of the rafters as required for the cornice. The ends of the boards should be allowed to extend a short distance beyond the end rafter. These will be trimmed off to a line later.
5. Nail four or five boards of equal length in place at one end of the roof.	NOTE: All of the boards should lap on the same rafter and should extend beyond the end rafter.

METHOD OF EVALUATION:

The instructor will:

1. check appearance of the finished product.
2. observe the student's procedures.
3. question orally.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-32

JOB: Install Spaced Board Sheathing

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: As Provided by Instructor

EQUIPMENT: Portable Power Saw

TOOLS: Framing Tools

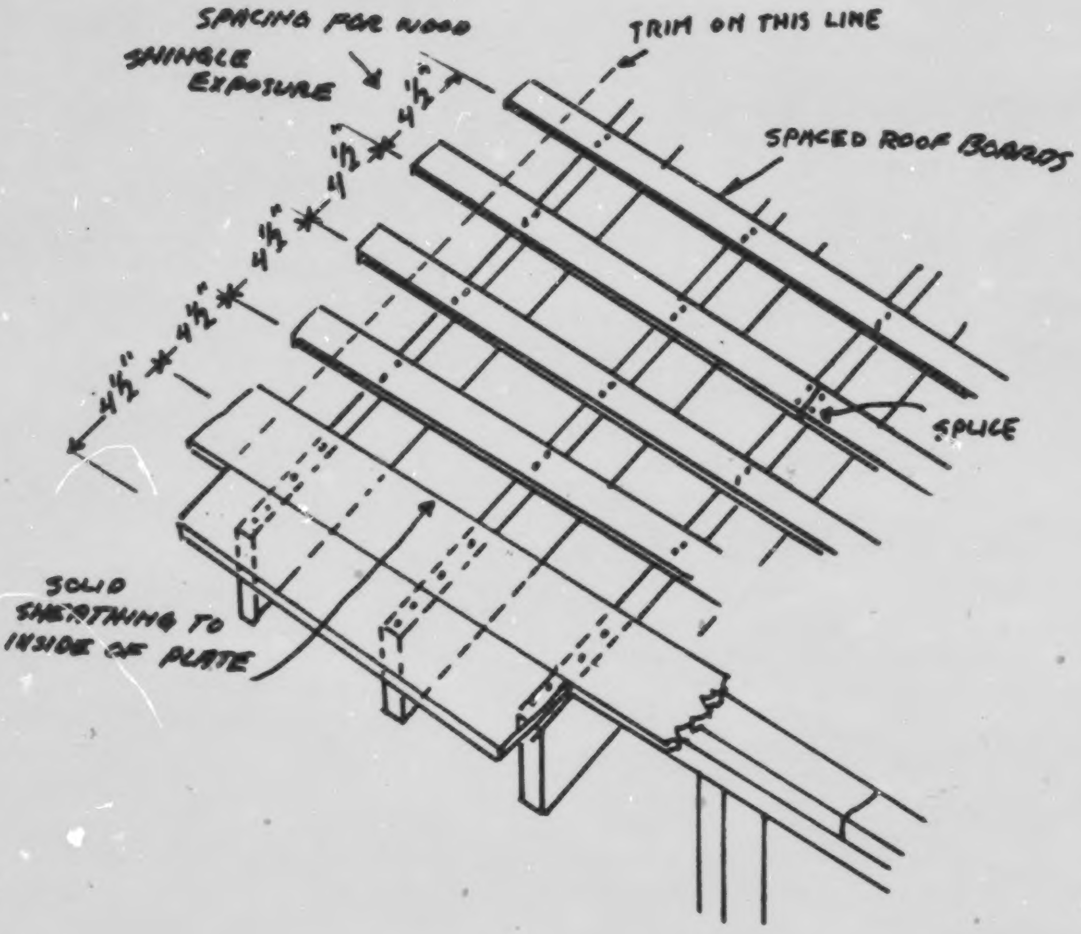
SAFETY PRECAUTIONS:

Use care when walking across the top of framing members such as joists and rafters and spaced sheathing. One slip is all it takes.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. When using an open cornice, place the sheathing boards tight together until you reach a point on the rafters which is in line with the inside of the studs.	NOTE: When wood shingles or shakes are used or when using certain types of metal roofing, it is common to use spaced roof boards.
2. Use 1 X 3 or 1 X 4 inch wide strips spaced the same distance on centers as the shingles are to be laid to the weather.	NOTE: This spacing will vary as the length of the shingle and the width of the strips vary. The lower edge of the nailing strip should fall directly under the butt of a shingle course. This will provide a solid nailing surface for the preceding course.
3. Nail the first board allowing it to extend beyond the end of the rafters as required for the cornice. This board may have to be wider than the others in order to nail it to the top of the rafter.	
4. Lay out the spacing on the top edge of the rafters and strike a chalk line to indicate the bottom edge of the nailing strips.	
5. Nail each strip to each rafter with two (2) eight penny nails.	

6. Continue to apply nailing strips over the entire roof surface making sure to keep the strips parallel to one another.

NOTE: It is common practice to allow the boards to extend beyond the gable end rafter. The boards are then cut off to a line after all the boards have been installed.


SPACING FOR WOOD SHINGLE EXPOSURE
TRIM ON THIS LINE
4½"
4½"
4½"
4½"
4½"
4½"
SPACED ROOF BOARDS
SPLICE
SOLID SHEATHING TO INSIDE OF PLATE

METHOD OF EVALUATION:

The instructor will
1. check accuracy of spacing.
2. observe and question orally.

JOB: Build a Chimney Saddle

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Rafter, Nails, Ridge Board, Sheathing

EQUIPMENT: Saw Horses, Portable Electric Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety--working at heights.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-7-33

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Lay out, cut and install valley strips.
2. Using the same method to lay out valley strips as when laying out a valley rafter, take the unit rise on the tongue of the square and 17 on the blade and step off as many units as there are feet in the run of the common rafter.
3. Lay out the top cut by using the unit length of the common rafter on the tongue of the square and the unit run (12) on the blade and mark along the tongue side.
4. Lay out the bottom cut by using the same figures but mark along the blade side.
5. Lay out, cut and install ridge piece for saddle.
6. Lay out on the edge of a 1" board a measurement equal to the run of the common rafter, less about 1/2" to allow for the drop of the ridge.
7. Lay out the cut where it fits against the valley strip by laying the square on the ridge piece and using the unit rise of the main roof on the tongue and the unit run (12) on the blade. Mark along the blade.
8. Lay out, cut and install rafters for the saddle. See Fig. 1.

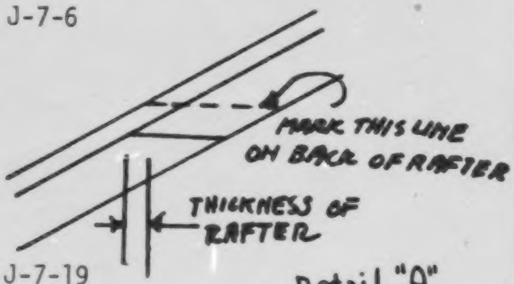
TEACHING/LEARNING ACTIVITIES

NOTE: The width of the chimney is the span of the saddle. One half the span is the run of the common rafter.

. J-7-14

The run of the common rafter must be shortened to allow for the valley strip and the roof sheathing in order to keep the flashing in line with the chimney corner. This distance is shown as "D" in Fig. 1. The easiest way to determine this distance is to make a full scale layout of the common rafter where it meets the valley strip. The distance "D" may then be measured and deducted from the run of the common rafter.

. J-7-6



. J-7-19

Detail "A"

9. Step off the length of the longest common rafter.
10. Shorten the rafter to allow for the ridge.
11. Lay out the seat cut and draw a plumb line at this point.
12. Measure back from the plumb line at right angle a distance equal to the thickness of the common rafter.
13. Draw another plumb line at this point.
14. Square a line across the top edge of the rafter at this point.
15. Connect the points on the opposite edges of the rafter to lay out the side cut.
16. Determine the common difference for the jack rafters.
17. Shorten the second rafter an amount equal to the common difference measurement.
18. Shorten the third rafter an amount equal to twice the common difference measurement, etc.
19. Lay out and cut as many rafters as needed to frame the saddle.
20. Cut and apply sheathing to saddle.

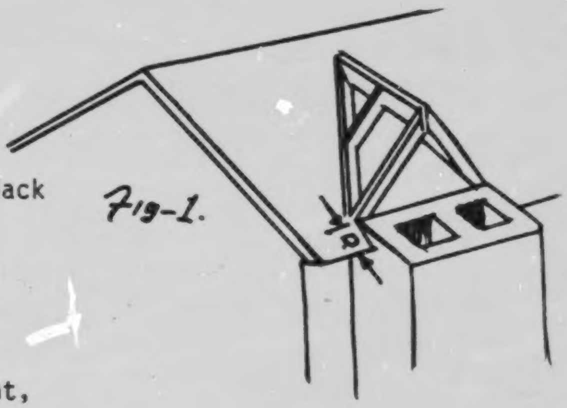


Fig-1.

. J-7-29

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
   a. cuts
   b. installation

JOB: Apply Temporary Roofing

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: 15 lb or 30 lb Asphalt Saturated Felt Paper

EQUIPMENT: Scaffolding
Ladders

TOOLS: Basic Hand Tools

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-34

SAFETY PRECAUTIONS:

Be careful not to step on roofing material that has not been nailed in place.

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Start at one end of the roof and apply one width of paper (usually 36") across the roof.
2. Cut the paper to length with a sharp knife. (A utility knife works well).
3. Allow the lower edge of the paper to extend over the fascia and the end of the paper to extend several inches beyond the end of the roof.
4. Nail in place along the top and bottom edge and along both ends, with galvanized roofing nails spaced about every 6" along the top edge and about every 4" along the bottom edge and ends.
5. Lay the next strip of paper, allowing it to overlap the first one by at least three inches. End splices should overlap at least four inches (4").

TEACHING/LEARNING ACTIVITIES

NOTE: Temporary roofing is applied to the finished roof frame over the sheathing in order to protect it and the rest of the house from the weather until the permanent roof can be installed. The material used for temporary roofs is either 15 lb. or 30 lb. asphalt saturated felt paper.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
6. Nail the strip in place as before being careful to keep the paper laying smooth on the roof when nailing.	
7. Work nailing up to the ridge from both sides.	NOTE: The last strip should be placed over the ridge so it overlaps the top piece on both slopes.

METHOD OF EVALUATION:

Appearance of the finished job will be checked by the instructor.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-7-35

JOB: Construct a Dormer

UNIT VII: Roof Framing

COURSE: Carpentry

MATERIAL: Ridge Board, Sheathing, Nails, Rafters, Studs

EQUIPMENT: Saw Horses
Portable Electric Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe ladder safety when working at heights.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Frame the opening for the dormer.	. J-7-27
2. Install front and side walls, according to plan.	. SC-7-19
3. Lay out and cut ridge board to length. Lay out to receive rafters.	. J-7-6
4. Erect common rafters and ridge board.	. J-7-7
5. Install jack rafters after sheathing has been applied to main roof.	. J-7-19
6. Install gable studs.	. J-7-9

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Alignment
3. Accuracy
    a. cuts
    b. installation

JOB: Install Blocking Between Rafters When Using An Open Cornice

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-1

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: #2 White Pine as Required for Job
8d Finish Nails
6d Finish Nails

EQUIPMENT: Scaffolding
Radial Saw
Jointer
Ladder

TOOLS: To be listed by the student

SAFETY PRECAUTIONS:

Observe all safety rules.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

Install blocking as in Fig. 1:

1. Snap a chalk line across the top edge of the rafters to indicate either the inside or the outside edge of the blocking.
2. Work the material to be used for blocking to a width equal to the width of the rafter tail.
3. Cut blocking material into lengths slightly longer than spacing between rafters.
4. Lay out and cut blocking to exact length and force into position.
5. Nail through the blocking into the wall sheathing near the bottom edge.
6. Toenail the top edge of the blocking to the rafters.
7. Apply solid sheathing to a point above the blocking.

NOTE: The open cornice may or may not use a frieze board. However, the spaces between the rafters at the plate line must be blocked off with some kind of a board to prevent wind passage into the attic area and to give the building a finished appearance

The blocking may be installed at right angle to the top edge of the rafter as in Fig. 1, or on a line parallel to the wall sheathing, as in Fig. 2.

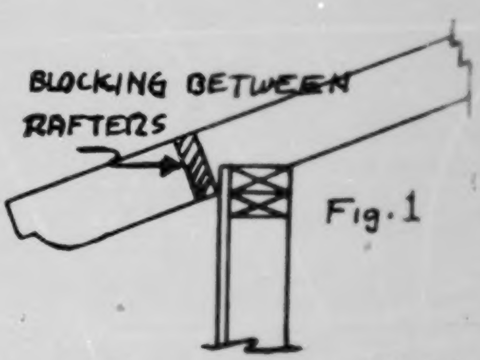


Fig. 1

Note: Nails may be driven through the roof sheathing into the top edge of the blocks if necessary.

Install blocking parallel to the wall line as in Fig. 2:

1. Cut pieces of blocking from 1 x 3 material and nail them to the sides of the rafters at the plate line.

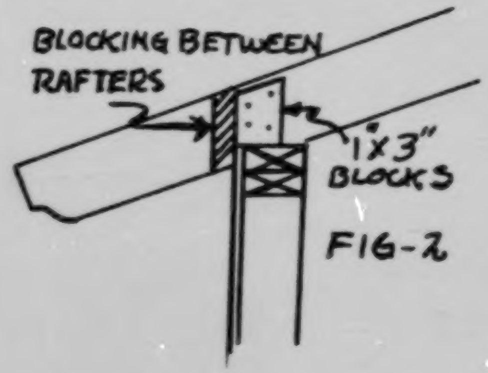


FIG-2

2. Lay out and cut the boards that will be used to block off the space between the rafters.
3. Nail the boards in place between the rafters and against the small blocks that were nailed against the side of the rafters.

NOTE: The top and bottom edge of the blocks should be cut on a bevel to match the slope of the rafters.

NOTE: The outside edges of the blocks should be in line with the outside edge of the finished wall covering or with the outside face of the lower frieze if a double frieze is used.

METHOD OF EVALUATION:

The instructor will:

1. check the appearance of the finished job .
2. observe techniques and procedures.
3. question orally.

JOB: Install Lookouts For Box Cornice

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 1 X 4's
#2 White Pine, As Required for Job as Assigned by the Instructor

EQUIPMENT: Scaffolding
Radial Saw
Ladder

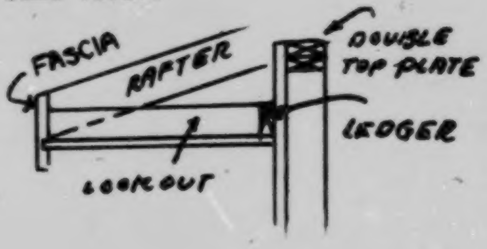
TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Think Safety At All Times

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-2

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Make a full scale drawing of the desired cornice. Use this drawing to determine the height at which the lookouts will be placed.	NOTE: If a sub-fascia is used, the bottom edges of the lookout ledger and the sub-fascia must be held to the same level.
2. Snap a chalk line on the wall at the level established in step #1. 3. Attach the lookout ledger to the wall studs with its bottom edge even with the chalk line. 4. Cut lookouts to length. 5. Nail a lookout in place at each end of the building so its bottom edge is even with the lookout ledger and so it is level from end to end.	
6. Stretch and secure a line to the bottom of the end lookouts near the end of the rafter.	NOTE: If building paper is being used it should be stapled to the wall before the lookout ledger is nailed in place.
7. Using the line to keep the outer ends of the lookouts in line, nail the remaining lookouts to the sides of each rafter and to the lookout ledger.	NOTE: If necessary, cut off the bottom of the rafters to prevent them from extending below the lookout.

METHOD OF EVALUATION:

The instructor will check the finished work for:

1. accuracy.
2. alignment.
3. nailing.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-3

JOB: Install Plancier (Soffit)

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 3/4" Pine or 3/8" Plywood as Required

EQUIPMENT: Scaffolding
Radial Saw
Jointer

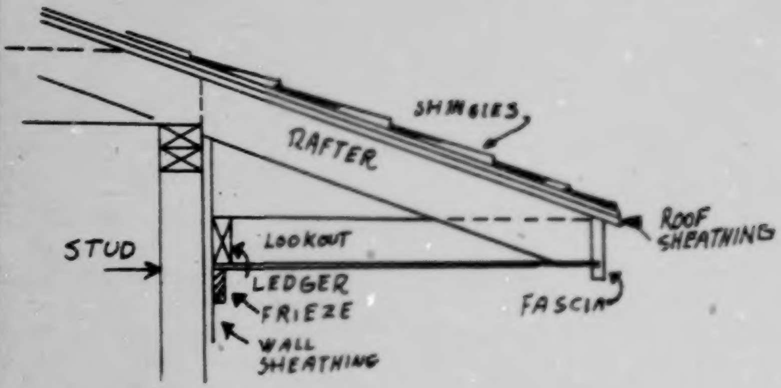
TOOLS: Carpenters Tool Kit

SAFETY PRECAUTIONS:

Observe all safety rules.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut the plancier material wide enough to extend from the wall to 1/4" beyond the rough fascia (or the end of the rafters if no rough fascia is used).	
2. Stretch a line along the rough fascia from one end of the building to the other.	
3. Place 1/4" blocks between the line and the rough fascia at both ends of the building.	NOTE: The type of nails to be used will be determined by the type of material being used for the plancier: 3/4" pine would require 8d finish or casing nails, 3/8" plywood would require 6d finish, etc.
4. Square one end of a piece of the material being used for the plancier.	
5. Hold the piece in place against the building with the squared end extending beyond the end of the building as required for the gable end cornice.	
6. Mark the other end in the center of a lookout and cut to length.	
7. Reposition the first piece as in step #5 and nail in place with its front edge in line with the chalkline.	
8. Continue across the entire length of the building, fitting each board very carefully to the previous one, and holding the front edge even with the line before nailing in place.	NOTE: At the other end of the building, allow the final piece to extend beyond the end of the building as required for the gable end cornice.

10. Set all nails. . SC-8-1


SHINGLES
RAFTER
ROOF SHEATHING
STUD
LOOKOUT
LEDGER
FRIEZE
WALL SHEATHING
FASCIA

METHOD OF EVALUATION:

The instructor will check the finished work for:

1. neatness.
2. alignment.
3. proper procedures.
4. nailing.
5. well fitting joints.

JOB: Install Vent Strips or Ventilators in Soffit

JOB SHEET IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-4

COURSE: Carpentry

MATERIAL:
Screen Wire
Screen Molding
Vent Strip

EQUIPMENT: Miter Box

TOOLS:
Stapler
Utility Knife
Basic Hand Tools
Hacksaw
Tin Snips
Miter Box

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

Install a screened vent:

1. Lay out the opening on the face of the soffit material according to the plans.
2. Cut out the opening (a sabre saw works well for this job).
3. Cut a piece of screen wire to rough size (approximately two inches larger than the opening) for each opening.
4. Staple screen wire over the bottom of the opening.
5. Cut pieces of screen molding to fit around the opening. Ends should be mitered.
6. Nail screen molding in place over top of the screen wire.
7. Remove excess screen wire around the outside of the molding with a sharp knife.

NOTE: Several types of ventilators are used in roder to increase the air passage into the attic area. Generally they fall into one of three categories:
1. screened openings
2. vent strips
3. pre-finished soffit materials with either holes or slots punched to provide for air passage. The prefinished materials are covered in J-8-13.

NOTE: Openings should fall between the rafters and be equally spaced across the building.

. SC-2-7

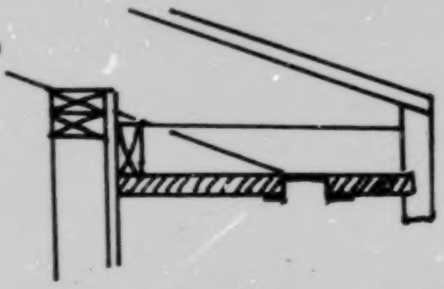
COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

Install a continuous vent strip:

1. Install the narrow piece of soffit material at the outer end of the lookouts or at the end of the rafters on a sloping cornice.
2. Determine the opening that must be left for the vent strip (allow 1/16" extra).
3. Strike a chalk line on the bottom edge of the lookouts to indicate the front edge of the wide piece of soffit material. (A spacer block may also be used to locate this edge).
4. Install the wide piece of soffit material to the chalk line.
5. Starting at either end of the building, place a piece of the vent strip in position in the opening provided and nail in place. (Small aluminum nails are best for this job since they will not rust).
6. Continue across the entire length of the building, cutting the end piece as required to finish the job.

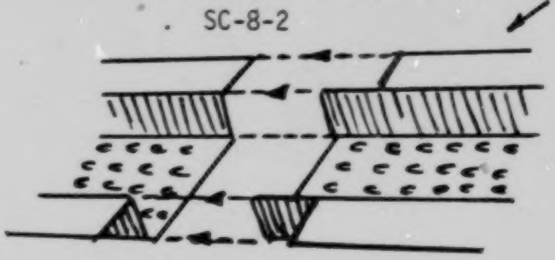
NOTE: The soffit material in this case must be installed in two pieces allowing room for the vent strip to fit between the two pieces.

NOTE: The vent strip should be located near the outer ends of the lookouts.



NOTE: Butt joints are usually satisfactory. Lapped joints may also be made as in Fig. 1.

. SC-8-2



METHOD OF EVALUATION:

The instructor will check the appearance of finished project.

JOB: Install Fascia and Frieze Boards

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: As Required for the Job
As Assigned by the Instructor

EQUIPMENT: Radial Saw
Jointer
Router
Scaffolding

TOOLS: Standard Carpenter's Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-5

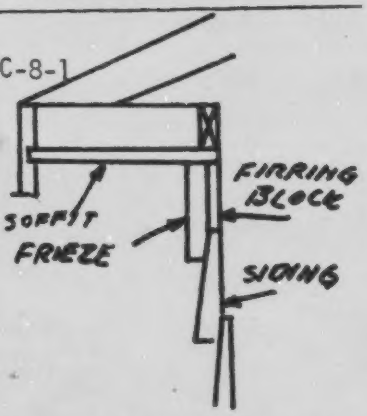
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
Install the fascia:	NOTE: Check the plans to determine the width of the fascia.
1. Work the fascia to width as needed.	
2. Plow a groove in the back of the fascia boards near one edge as required for the plancier.	. SC-2-36
3. Cut a 45° miter on one end of the fascia board.	. SC-2-17
4. Hold the fascia board in place with the miter cut in position to receive the rake board. (gable end fascia)	
5. Mark the other end of the board in the center of a rafter and cut to length.	NOTE: If a rough fascia is used, the end joint can be made anywhere. If the fascia is nailed to the ends of the rafters, the end joints must fall in the center of a rafter.
6. Nail the first piece of fascia at each end with 8d casing nails	
7. Continue across the entire length of the building, fitting each board very carefully to the previous one, and straightening the bottom edge before nailing.	
8. When fitting the last board at the opposite end of the building, make the miter cut first, hold the board in place, then lay out and make the square cut last.	

9. Set all nails.

Install a frieze board:

1. Check the plans to determine the width of the material to be used for the frieze, then work the material to width.
2. Strike a chalk line across the building to indicate the location of the bottom edge of the frieze.
3. Cut small furring blocks of the same thickness as the top edge of the siding being used.
4. Nail the furring blocks in place at each stud location holding them up from the bottom edge of the frieze board to allow for the siding.
5. Square the ends of enough frieze stock to reach the length of the building.
6. Use 8d casing or finish nails to fasten the pieces of frieze in position, nailing only along the top edge of each piece.
7. Nail the bottom edge after the siding has been installed.
8. Set all nails.

. SC-8-1



NOTE: Small furring blocks are installed to hold the frieze board out from the face of the sheathing to allow the siding to slide behind the bottom edge of the frieze.

NOTE: If the frieze board is to be continued on the end of the building or if a cornice return is to be built, the end pieces must be mitered.

. SC-8-1

METHOD OF EVALUATION:

1. Check appearance of finished project.
2. Check joints.
3. Check nailing.
4. Observation and oral questioning.

JOB: Cut and Install Moldings on Cornices (Crown, Cove, Bed)

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 3" Crown Molding
3/4" Cove Molding
2" Bed Molding

EQUIPMENT: Cornice Mock-up

TOOLS: Miter Box

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-6

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

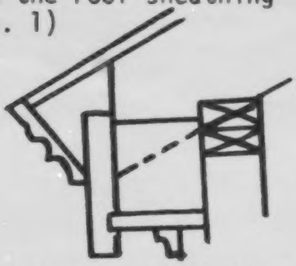
Install crown molding with its top edge flush with the roof sheathing:

1. Cut a short piece of molding to use as a pattern.
2. Hold the piece of molding in place with its top edge in line with the top edge of the roof sheathing.
3. Mark a line along the bottom edge of the molding.
4. Gage a line along the full length of the fascia through the line marked in step #3.
5. Cut a miter on one end of the crown molding. Square the other end.
6. Align the miter cut at the end of the fascia and the bottom edge of the molding with the line.
7. Nail to the fascia along the bottom edge and to the roof sheathing along the top.
8. Set all nails.
9. Continue across the building fitting each piece of molding to the preceding one.

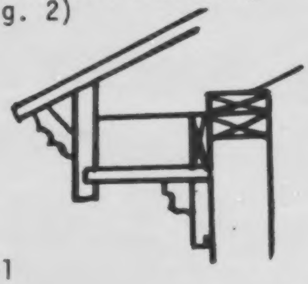
TEACHING/LEARNING ACTIVITIES

NOTE: Crown molding used as part of a cornice is usually placed in one of two ways:

1. with its top edge flush with the roof sheathing (Fig. 1)



2. with its top edge butted against the lower surface of the roof sheathing (Fig. 2)



. SC-8-1

10. Upon reaching the opposite end of the building, cut a piece of molding to rough length.

11. Hold molding in place and mark the short point of the miter.

12. Miter the end of the molding, then nail in place.

13. Cut and fit crown molding around the cornice returns.

14. Cut and fit molding on gable ends.

Install cove and bed moldings:

1. Cut a miter on one end of a piece of molding and square the other end. (Miter the second end if you prefer)

2. Hold the first piece of molding in place and nail it.

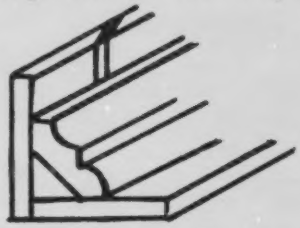
3. Fit the second piece to the first, the third to the second, etc.

4. Continue across the building until the opposite end is reached. Hold the last piece in position, mark the short point of the miter.

5. Cut the miter, hold the molding in place and nail.

6. Set all nails.

NOTE: In most cases, moldings are held upside down in the miter box when making miter cuts. Fig. 3



. SC-2-17

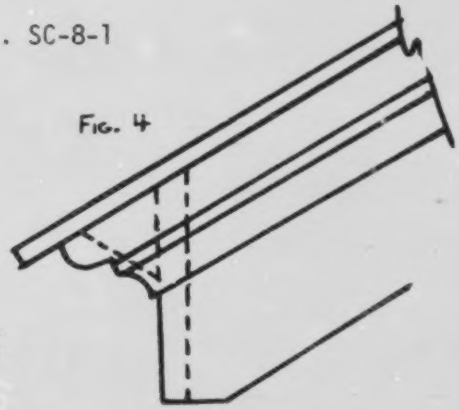
NOTE: Some carpenters prefer to miter the ends of all pieces of molding regardless of whether the pieces of molding are in line or at an angle with one another.

NOTE: If a cornice return is used, the crown molding may be held with its back fitting tight against the fascia. The molding is then mitered and returned around the fascia and back to the building. The molding which is returned to the building should be nailed temporarily until the siding is placed.

If the crown molding is to be continued up the rake, (with no cornice return) the crown molding must be placed along the fascia with its top edge fitting against the roof sheathing as shown in Fig. 4. In this case it is usually better to install the rake molding first in order to establish the position of the molding along the eave.

. SC-8-1

Fig. 4



METHOD OF EVALUATION:

The instructor will check:
1. appearance of finished project.
2. mitering techniques.
3. nailing methods.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-7

JOB: Construct an Open Cornice

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: As Required For The Job

EQUIPMENT: Radial Saw
Jointer
Band Saw

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

1. Observe all rules pertaining to ladder and scaffold safety.
2. Observe all rules pertaining to power tools.
3. Safety goggles

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select materials.	NOTE: There are many variations of the open cornice, all utilizing exposed rafter tails and exposed roof sheathing. The rafter tails (outlookers) may be specially cut pieces which are attached to the side of the rafters or they may be extensions of the rafter itself. Roof sheathing used over the exposed tails should be thick enough to prevent roofing nails from penetrating the bottom surface.
2. Erect scaffolding to a convenient working height.	
3. Cut and install outlookers (rafter tails) if separate from the rafters.	
4. Install blocking between rafters at the plate line.	
5. Apply roof sheathing (at least 3/4" thick) to a point above the plate line.	
6. Line the underside of the exposed gable end sheathing with 1/4" or 3/8" plywood (for looks and to prevent the nails from coming through).	
7. Install the fascia and the rake board.	
8. Install moldings.	

METHOD OF EVALUATION:

1. Material selection
2. Accuracy
   a. cuts
   b. installation
3. Appearance

JOB: Construct a Closed Cornice (Box)

JOB SHEET IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-8

COURSE: Carpentry

MATERIAL: As required for the job designed by the instructor

EQUIPMENT: Radial Saw
Jointer

TOOLS: Standard Carpenter's Tool Kit

SAFETY PRECAUTIONS:

1. Observe all rules pertaining to scaffolding.
2. Observe all rules pertaining to power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select materials for lookouts, plancier, frieze, and fascia.	
2. Work all materials to width according to plan.	
3. Erect scaffolding as needed.	
4. Fasten the lookout ledger to the wall.	
5. Install the lookouts.	
6. Install the plancier.	
7. Install the fascia.	
8. Install the frieze board.	
9. Install vents or vent strips, as necessary.	
10. Install crown, bed and cove moldings, as necessary.	

METHOD OF EVALUATION:

1. Material selection
2. Accuracy
    a. cuts
    b. installation
3. Appearance

JOB: Construct a Receding Cornice (Sloped)

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-9

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: As required for the job

EQUIPMENT: Radial Arm Saw
Jointer
Miter Box

TOOLS: Basic Tool Kit

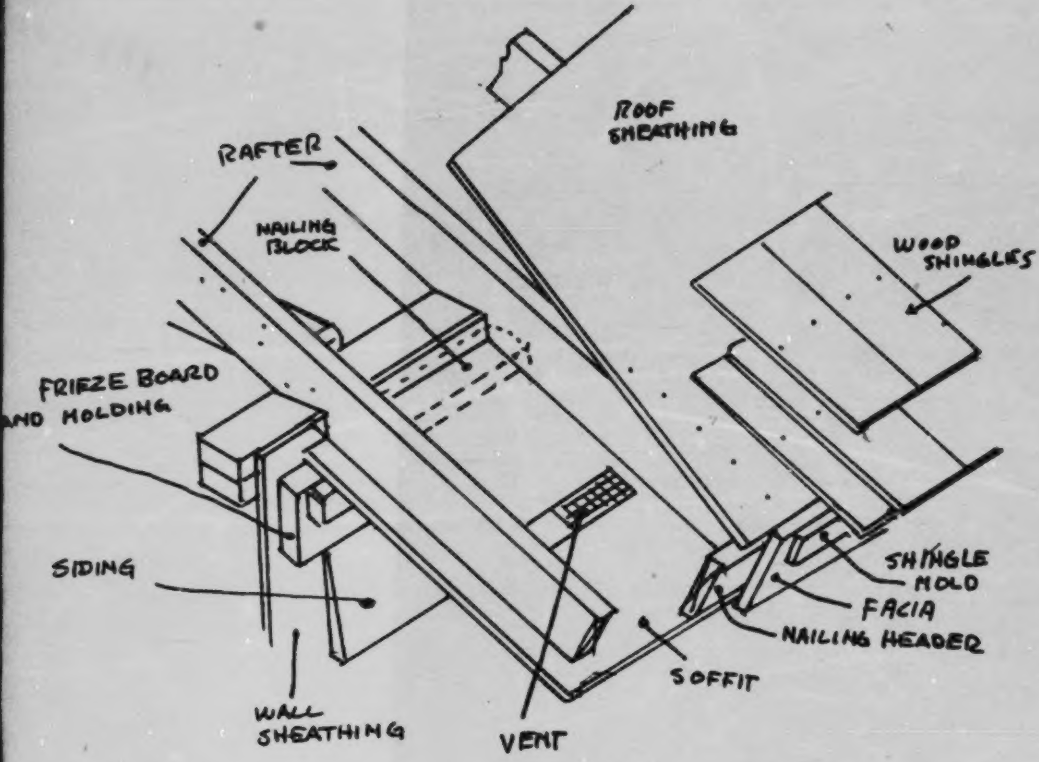
SAFETY PRECAUTIONS:

1. Observe all rules pertaining to scaffolding safety.
2. Observe all rules pertaining to power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select materials for the plancier (soffit) and the fascia.	
2. Work materials to width as needed.	
3. Erect a scaffolding.	
4. Install the nailing blocks between the rafters at the plate line.	
5. Install the soffit leaving room for a vent strip.	
6. Install the fascia.	
7. Install the frieze board.	
8. Install the vent strip.	
9. Install moldings along the eaves.	
10. Install the rake soffit.	
11. Install the gable end fascia (rake board).	
12. Install rake moldings.	

METHOD OF EVALUATION:

1. Material selection
2. Accuracy
   a. cuts
   b. installation
3. Appearance


ROOF SHEATHING
RAFTER
NAILING BLOCK
WOOD SHINGLES
FRIEZE BOARD AND MOLDING
SIDING
SHINGLE MOLD
FACIA
NAILING HEADER
SOFFIT
WALL SHEATHING
VENT

SLOPED RECEDING CORNICE

DRAWING NUMBER

D-8-9

JOB: Construct a Flush Gable Cornice

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: As required for the job

EQUIPMENT: Radial Arm Saw
Jointer
Miter Box

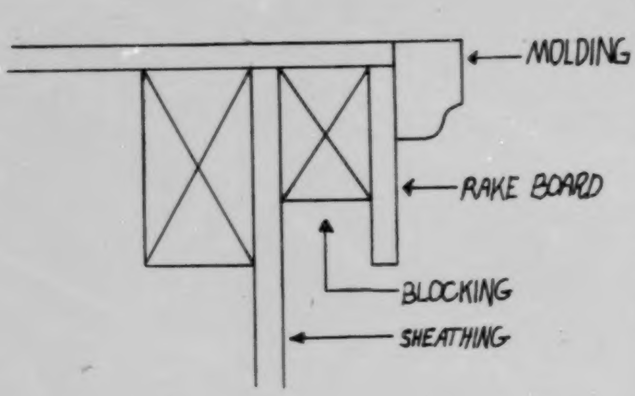
TOOLS: Basic Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-10

SAFETY PRECAUTIONS:

1. Use care in climbing.
2. Use care in use of power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select materials needed for the blocking, the rake board and the molding.	
2. Work material to width.	
3. Nail the blocking in place along the full length of the rake.	
4. Install the rake board.	
5. Install the rafter molding.	

METHOD OF EVALUATION:

1. Material selection
2. Accuracy
   a. cuts
   b. installation
3. Appearance

JOB: Construct an Extended Gable Cornice

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: As required for the job

EQUIPMENT: Radial Arm Saw
Jointer
Miter Box

TOOLS: Basic Tool Kit

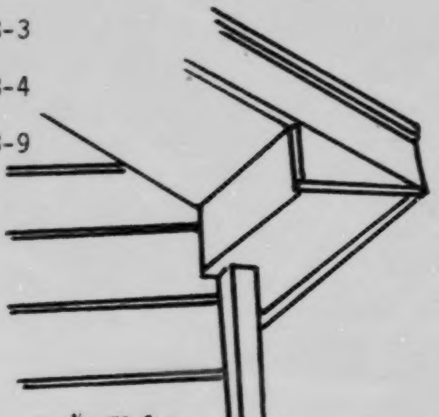
JOB SHEET
IDENTIFICATION CODE

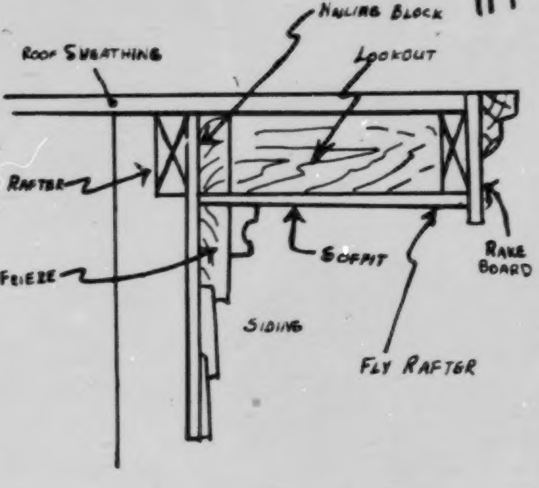
JOB NUMBER: J-8-11

SAFETY PRECAUTIONS:

1. Observe all rules pertaining to ladder and scaffold safety.
2. Observe all rules pertaining to power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select materials.	. IL-6-16
2. Work all materials to width.	. IL-6-19
3. Erect a scaffolding.	. IL-8-1
4. Install nailing block to provide nailing at the wall line (similar to the lookout ledger on the closed cornice).	. IL-8-3 . IL-8-4
5. Install lookouts between nailing strip and the fly rafter.	. IL-8-9
6. Install soffit.	
7. Box off the open area at the rear of the eave soffit.	
8. Install rake board (gable end fascia).	
9. Install triangular shaped piece to close off eave cornice	
10. Install rake moldings.	





METHOD OF EVALUATION:
1. Material selection
2. Accuracy
    a. cuts
    b. installation
3. Appearance

JOB: Install Nailers for Exterior Trim When Using Brick Veneer

JOB SHEET IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-12

COURSE: Carpentry

DRAWING NO.:

MATERIAL 3/4" White Pine
2 X 4 Blocks

EQUIPMENT: Scaffolding, Radial Saw, Portable Ladders, Circular Saw

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Be careful when working on scaffolds and ladders.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

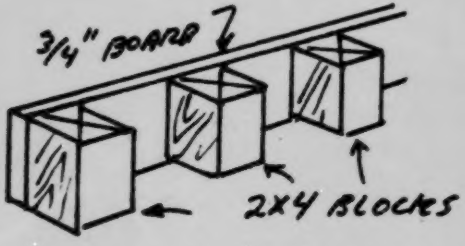
Install blocking for the frieze board:

1. Determine the width of the frieze board and strike a line on the wall indicating the location of the bottom edge.

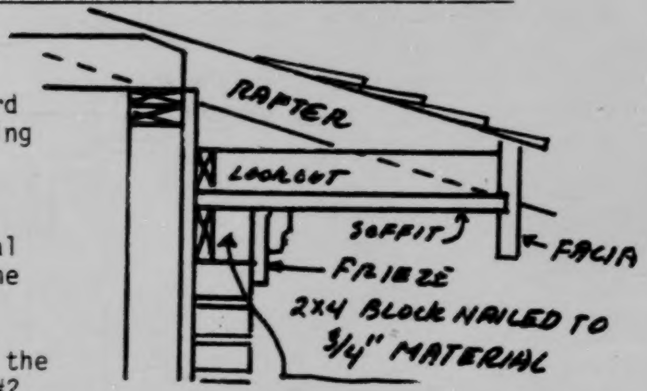
2. Rip material to run the entire length of the building. Width of the material should be 1" less than the width of the frieze board.

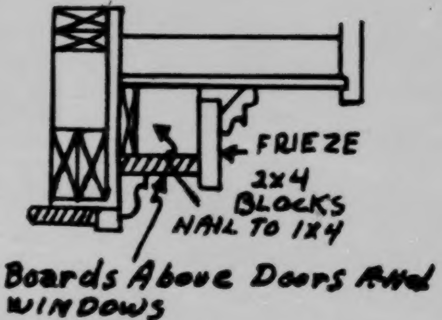
3. Cut 2 x 4 blocks to a length equal to the width of the material ripped in step #2.

4. Nail the 2 x 4 blocks to the 3/4" material at 16" on center.


3/4" BOARD
2X4 BLOCKS

5. Nail the 3/4" material to the wall holding the bottom edge up 1" from the chalk line.


RAFTER
LOOKOUT
SOFFIT
FASCIA
FRIEZE
2X4 BLOCK NAILED TO 3/4" MATERIAL


FRIEZE
2x4 BLOCKS
NAIL TO 1X4
Boards Above Doors And WINDOWS

NOTE: When using brick veneer, blocking must be provided in order to nail certain trim members. These would include the frieze board and the rake board or gable end fascia as it is sometimes called.

COMPETENCE - PROCEDURE/STEPS

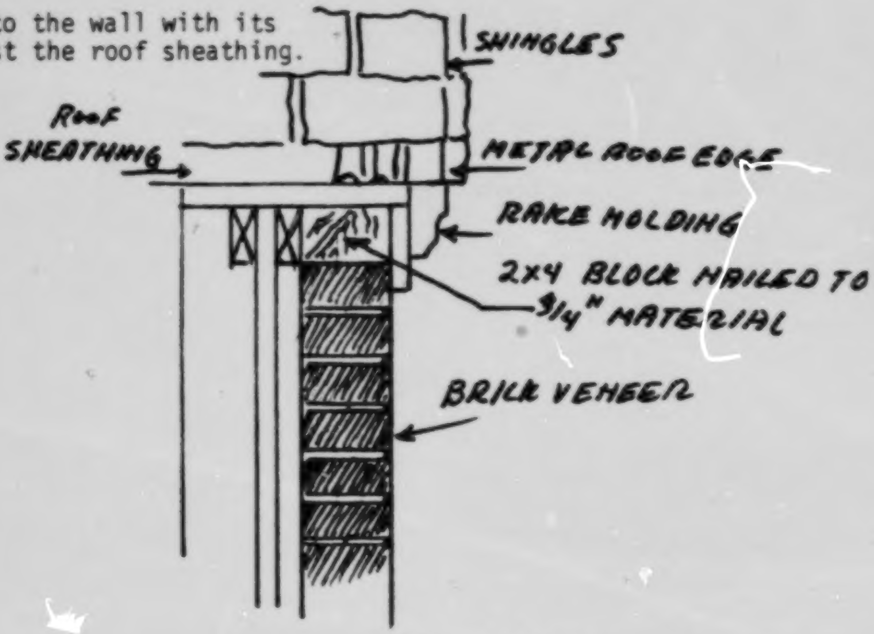
TEACHING/LEARNING ACTIVITIES

6. Fill in the space over the door and window frames with a 3/4" thick board as shown in Fig. 1.

Install blocking for the rake board:

1. Rip 3/4" material 1" less than the width of the rake board.
2. Cut 2 x 4 blocks to a length equal to the width of the material ripped in step #1.
3. Nail the 2 x 4 blocks to the 3/4" material on 16" centers.
4. Nail the 3/4" board to the wall with its top edge tight against the roof sheathing.

NOTE: This board over top of door and window openings need not be installed until just prior to the installation of the frieze board. The frieze board will not be installed until the masonry work has been completed.


SHINGLES
ROOF SHEATHING
METAL ROOF EDGE
RAKE MOLDING
2X4 BLOCK NAILED TO 3/4" MATERIAL
BRICK VENEER

NOTE: Additional blocking may be needed at the ridge and at the lower end of the rake in order to provide nailing for the joints.

METHOD OF EVALUATION:

Check work for:

1. alignment.
2. proper procedures.

JOB: Install Prefinished Cornice Materials

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: Prefinished Soffit and Fascia
Materials as required to complete the job

EQUIPMENT: Radial Saw with Metal Cutting Blade
Scaffolding
Ladders

TOOLS: Tin Snips
Basic Tool Kit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-13

SAFETY PRECAUTIONS:

1. Wear full cover goggles when cutting metal with a power saw.
2. Be careful when handling sharp edged materials.

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Lay out and cut the wall channel to length.
2. Install the wall channel having its upper edge even with the lower edge of the rough fascia.
3. Cut the pieces of soffit material long enough to extend from inside the channel to the outer face of the rough fascia.
4. Remove the tongue from the first piece of soffit, hold the cut edge even with the end of the cornice, slide one end into the wall channel and then nail the outer end into the rough fascia. (One small aluminum nail through the nailing flange.)
5. Slide the second piece into position making sure that the edges interlock; then nail it at its outer end.
6. Continue across the building until all of the soffit has been installed.
7. Cut the fascia material to width as needed; hold the end of the first piece even with the end of the rough fascia; then nail in place.

TEACHING/LEARNING ACTIVITIES

NOTE: Aluminum, steel, vinyl and hardboard manufacturers have developed cornice materials which may be installed quickly and are practically maintenance free. Directions for the installation of the various materials are usually included in the package or are available at building supply dealers. For most of the products, the installation includes the steps described here.

NOTE: The installation of most pre-finished materials requires great care in handling. Care must be taken not to bend, dent, or scratch the material.

NOTE: Most pre-finished cornice materials can be cut with a fine tooth metal cutting blade on a radial saw.

8. Continue across the building, overlapping the ends of adjoining pieces.

9. Apply the soffit material to the rake in the same manner as to the eaves.

10. Apply fascia to the rake allowing about 1" extra to bend around the fascia at the lower end.

NOTE: On hip roofed buildings and on buildings having a cornice return, a double channel ("H") molding may be used at the corners of the building, running at a 45° angle to either side of the building. The ends of the soffit pieces are then mitered to fit into the channel and cut square on the other end to be flush with the rough fascia.

NOTE: Special nails with heads painted to match the color of the fascia material are available and should be used.

NOTE: If cornice returns are used they should be completely covered before the rake cornice is applied.

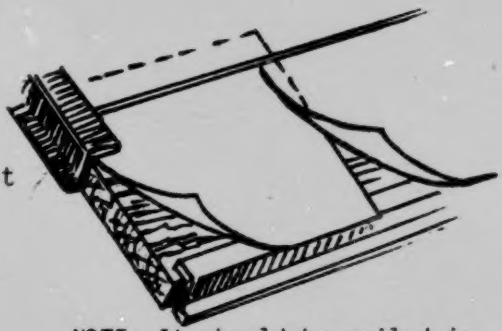
NOTE: When making the joint at the ridge, allow the pieces to overlap. On the fascia, make a plumb cut only on the piece that is applied last.

NOTE: For more detailed instructions refer to individual manufacturer's installation manual.

METHOD OF EVALUATION:

The instructor will:
1. check overall appearance.
2. check cutting and bending techniques.
3. observe and question orally.

JOB:	Install Drip Edge	JOB SHEET IDENTIFICATION CODE
UNIT VIII:	Exterior Finish	JOB NUMBER: J-8-14
COURSE:	Carpentry	
MATERIAL:	Drip Edge (Galvanized, Aluminum, or Vinyl) Galvanized Roofing Nails	
EQUIPMENT:	Scaffolding Ladders	
TOOLS:	Tin Snips Basic Tool Kits	

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Hold one end of a piece of drip edge even with the farthest projection on the rake cornice and place the lower edge tight against the cornice at the eaves and nail in place.	NOTE: Nailing should be with galvanized roofing nails at about 12" intervals.
2. Apply the second piece along the eave overlapping the first piece about 1"	
3. Continue across the eave, overlapping all joints until the other end of the building is reached.	
4. Cut the last piece of drip edge and nail in place with its end even with the farthest projection on the rake cornice.	
5. After the underlayment has been installed, apply the drip edge along the rakes.	 NOTE: It should be nailed in place over top of the underlayment and should be held with its end even with the drip edge along the eave.

METHOD OF EVALUATION:

1. The instructor will inspect the finished work.
2. The instructor will inspect the joints.
3. The instructor will inspect nailing.
4. The instructor will observe cutting techniques.

JOB:	Install Valley Flashing (Gravel Surfaced Roll Roofing)	JOB SHEET IDENTIFICATION CODE
UNIT VIII:	Exterior Finish	JOB NUMBER: J-8-15
COURSE:	Carpentry	
MATERIAL:	1 Roll Gravel Surfaced Roofing Galvanized Roofing Nails Asphalt Roof Cement	
EQUIPMENT:	Scaffolding Ladders Roof Jacks	
TOOLS:	Basic Tool Kit	

SAFETY PRECAUTIONS:

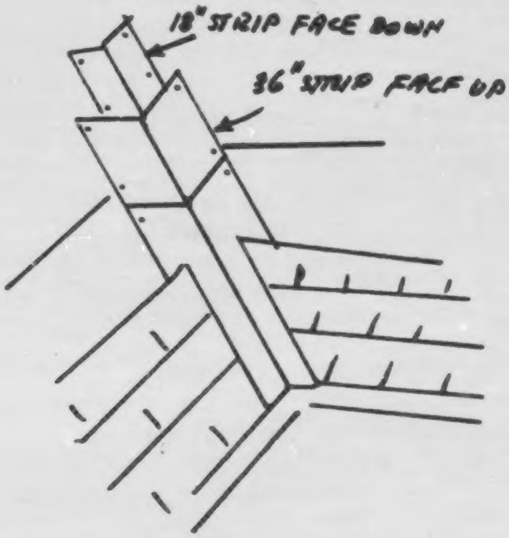
1. Ladder and scaffold safety
2. Use extra care when climbing
3. Non-slip soles on shoes

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Measure the valley from the eave to the ridge. Add 24" to this measurement.	
2. Cut a piece of gravel surfaced roofing 18" wide and to a length equal to the total measurement found in step #1.	
3. Cut a second strip of gravel surfaced roofing (same color as the roofing) 36" wide and at least 18" longer than the total measurement from step #1.	
4. Lay the 18" strip mineral surface down, centered in the valley.	
5. Cut the bottom end to follow the eave lines on the intersecting roofs.	NOTE: The inside corner should be slightly rounded when making this cut in order to prevent tearing.
6. Hold the strip in place, then nail along one edge from top to bottom with galvanized roofing nails.	
7. Press the material firmly into the valley while nailing the second edge.	NOTE: Make sure all wrinkles are removed before nailing.
8. Bend the top end over the ridge, slit the material as needed to make it lay flat on all roof slopes and then nail in place.	

9. Apply the second strip (36" wide) with the mineral face up using the same procedure as for the first strip.

10. Before bending the material over the ridge apply a layer of plastic roof cement over a small area where the ridge of the intersecting roof meets the main roof slope.

11. Bend the material over the ridge, slit as needed to make it lay flat and nail in place.



METHOD OF EVALUATION:

Instructor will inspect the finished work.

JOB: Prepare and Install Chimney Flashing

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-16

UNIT VIII: Exterior Finish

COURSE: Carpentry

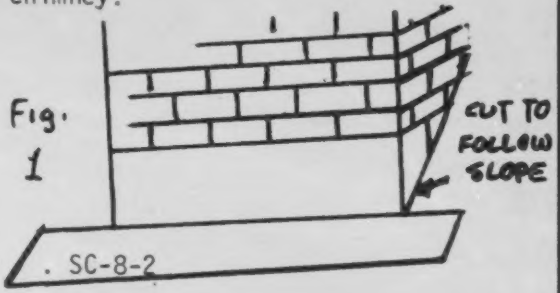
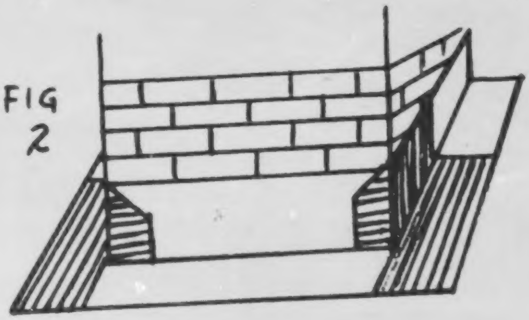
MATERIAL: Aluminum or Galvanized Flashing Material

EQUIPMENT: Scaffolding
Ladders
Roof Jacks

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Be careful when cutting and handling thin metal.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Construct a saddle on the back side of the chimney.	NOTE: The top of the cutouts on the last course should be no more than 6" below the face of the chimney.
2. Lay shingles up to the front face of the chimney.	
3. Cut and bend the piece of base flashing for the front face of the chimney so that it extends down on the shingles at least 5" and up the chimney 5" and the ends should extend beyond the chimney at least 4", for the front face of the chimney.	Fig. 1 . SC-8-2
4. Cut pieces of metal 8" x 8" to use for step flashing along the sides of the chimney.	. SC-8-2
5. Bend the step flashing at right angle so that 5" extends up the chimney and 3" extends out on to the roof deck.	FIG 2 
6. Install the base flashing along the front face of the chimney bending the corners as shown in fig. 1.	
7. Place the individual step flashing along both sides of the chimney as the roofing shingles are laid.	
8. Bend the piece of flashing at the lower corners of the chimney as shown in Fig. 2.	NOTE: Each piece of flashing is laid underneath the shingles and overlaps the preceding piece.

COMPETENCE - PROCEDURE/STEPS

9. Apply the base flashing over the saddle on the upper side of the chimney. This flashing should be bent to conform to the shape of the saddle, the main roof, and the chimney and should extend up the chimney at least 6" and on to the main roof an equal amount. (Fig. 3)

10. Cut and bend the counter flashing for the lower face of the chimney from one piece of metal allowing extra metal to bend around the sides of the chimney. The bottom edge of the counter flashing should extend to within 1" of the roof.

11. Insert the counter flashing into the mortar joint and fasten with metal wedges.

12. Cut and bend the cap flashings for the sides of the chimney.

13. Cut the bottoms of the cap flashings (counter flashings) for the sides of the chimney to follow the roof slope, insert the upper edge into the mortar joint, then fasten with metal wedges.

14. Continue to install counter flashing up the sides and across the back side of the chimney.

15. Point up all mortar joints.

16. Continue to apply roof shingles above the chimney leaving the base flashing on the saddle completely exposed.

TEACHING/LEARNING ACTIVITIES

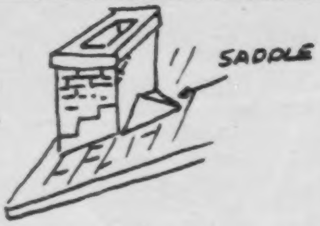


FIG 3.

NOTE: All of the counter flashings should be bent at right angles allowing 1" of metal on the top to be inserted into the brick joints.

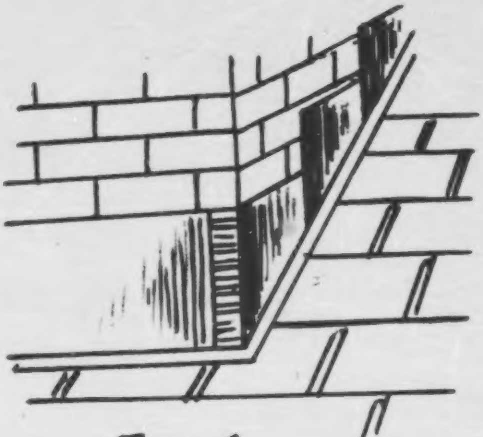


FIG. 4

NOTE: Some carpenters prefer to pour the joints full of lead, others prefer to tamp it full of soft lead, others prefer the mortar.

NOTE: Treat the valley above the chimney as you would any other valley.

METHOD OF EVALUATION:

The instructor will:
1. check appearance of finished project.
2. observe and question orally.

JOB: Install a Roof Safe (Vent Stack) Flashing

JOB SHEET
IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-17

COURSE: Carpentry

MATERIAL:
Vent Stack
Vent Stack Flashing

EQUIPMENT:
Scaffolding
Roof Jacks
Ladder

TOOLS:
Tin Snips
Basic Tool Kit

SAFETY PRECAUTIONS:

Be extra careful when working on a roof.

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Apply roofing up to the point where the vent sticks through the roof.
2. Cut and fit shingles around the stack as shown in Fig. 1.
3. Install the roof safe over top of the shingle course. Fig. 2.
4. Lay roof shingles around the stack and over top of the flange as shown in Fig. 3.

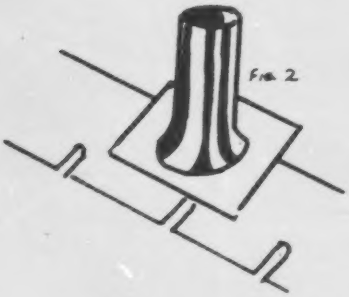


Fig. 2

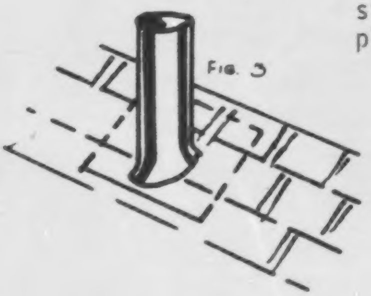


Fig. 3

TEACHING/LEARNING ACTIVITIES

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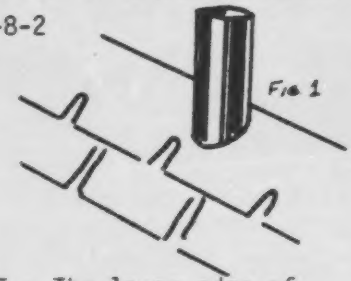


Fig 1

NOTE: The lower edge of the flange and the ends of the shingles next to the stack should be cemented in place.

METHOD OF EVALUATION:

Instructor will inspect the finished work for:
1. appearance.
2. weather resistance.

JOB: Install Individual Flashing
(Step-Flashing)

JOB SHEET
IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-18

COURSE: Carpentry

MATERIAL: Flashing Material
(Galvanized or Aluminum)

EQUIPMENT: Scaffolding
Roof Jacks
Ladders

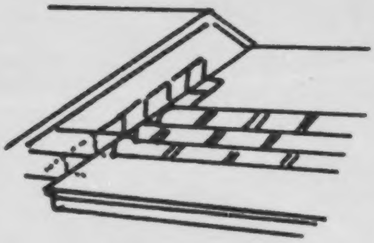
TOOLS: Tin Snips
Basic Tool Kit

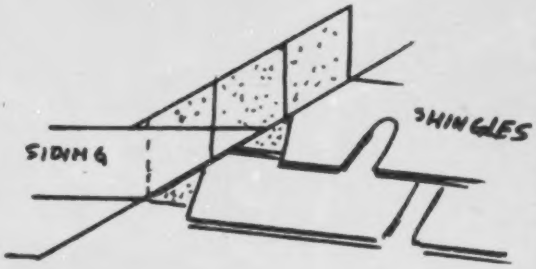
COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Cut pieces of rust resistant metal 7" x 8".
2. Bend the metal at right angle so about 3" extends out onto the roof deck and 4" extends up the wall.
3. As each course of shingles is laid, a piece of flashing is set in place under the shingle with its bottom edge slightly above (1/4" to 3/8") the butt edge of each row.
4. While holding the flashing in place against the wall, drive a roofing nail through the shingle, through the flashing and into the roof deck.
5. Continue up the roof in the same manner keeping the pieces of flashing just above the butt edge of each row of shingles.

TEACHING/LEARNING ACTIVITIES

. SC-8-2





METHOD OF EVALUATION:

The instructor will check the finished work for:
1. neatness.
2. weather resistance.
3. proper installation.

JOB: Apply Asphalt Strip Shingles
UNIT VIII: Exterior Finish
COURSE: Carpentry
MATERIAL: Asphalt Strip Shingles
TOOLS: As needed to perform the job

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-19

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Apply a starter strip so it overlaps the drip edge at the eaves and at the rake approximately 3/8".
2. Measure the length of the roof overall, including the overhang at the rake. Use this measurement to determine the size of the starting tab. (See Example)
3. Start the first course with a shingle having two full tabs plus the starting tab (in the example, two full tabs plus 5-3/16")
4. Start the second course with a shingle that is six inches shorter than used in the first course; the third course with one six inches shorter than the second, etc. until a complete set of starters has been cut. (a complete set in the example would include shingles of 29-3/16", 23-3/16", 17-3/16", 11-3/16", 5-3/16")
5. Make the next set of starters exactly the same except that the first shingle would be 35-3/16" long.
6. Cut as many sets of starters as necessary to extend from the eave to the ridge.
7. Align the butt edge of the first course with the starter strip and nail in place with (4) nails per shingle.
8. Strike chalklines to mark the top edge of each course of shingles.
9. Apply each course of shingles to the chalklines.

TEACHING/LEARNING ACTIVITIES

NOTE: The starter strip may be a strip of mineral surfaced roofing of a weight and color to match the shingles or it may be a row of strip shingles turned around so the tabs point up the roof instead of down.

NOTE: If no drip edge is used on the gable ends the shingles should be extended beyond the roof sheathing 3/4".

NOTE: The purpose in determining the size of the starting tab is to insure that the end tabs on both ends of the roof are equal. This method also eliminated having a starting or finishing tab of less than 3"

Example:
Length of roof including overhang =23'-4-3/8"

The rule for determining the size of the starting tab when centering the cutouts directly over the center of the tabs in the preceding course is as follows:

1. Take the total measurement in feet and inches. (23'-4-3/8")
2. If the inch measurement is less than 6" (the actual spacing between rows of cutouts) add six to the inch measurement and divide by

10. Continue to apply roofing shingles until a point near the ridge is reached. The last several rows near the ridge may have to be adjusted slightly to insure that they run parallel to the ridge.

11. Apply shingles to the other roof slope in the same manner.

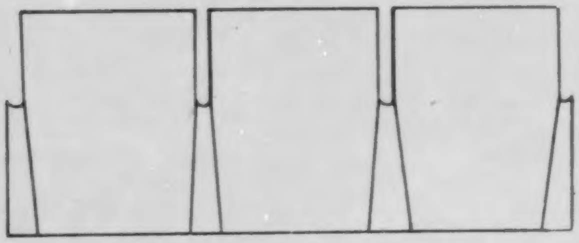
12. Upon reaching the ridge, cut the shingles on the one roof slope even with or slightly shorter than the ridge. The shingles on the other roof slope may then be lapped over top of the ridge and nailed on the opposite side.

two. (4-3/8" + 6" = 10-3/
(10-3/8" divided by 2 = 5-3/16")
Size of starting tab = 5-3/16"

3. If the inch measurement is 6" or more, simply divide 2 to get the size of the starting tab.

NOTE: On small roofs, strip shingles may be laid from either rake, but on roofs of 20' or longer, it is better to start them in the center and work both ways from a vertical line. This will in more accurate vertical align over the entire roof.

The striking of chalklin as a guide for shingles will insure vertical, horizontal diagonal alignment.



METHOD OF EVALUATION:

The instructor will :
1. check appearance of finished job.
2. check alignment of cutouts and rows.
3. check cutting methods.

JOB: Apply Cap Shingles to Hips and Ridges

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-20

UNIT VIII: Exterior Finish

COURSE: Carpentry

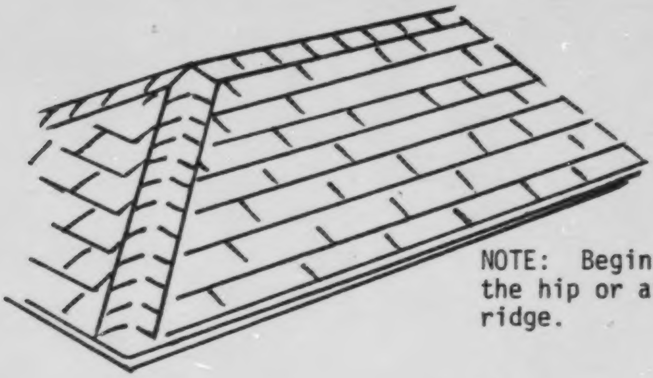
MATERIAL: 12 X 36 Strip Shingles
1 1/2" Galvanized Roofing Nails

TOOLS: As required to complete the job

SAFETY PRECAUTIONS:

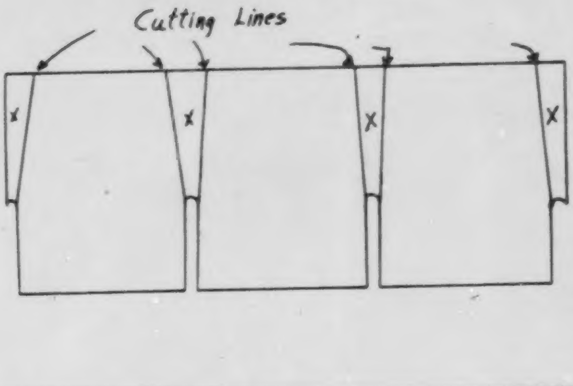
Be careful when climbing near the edge of a roof.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut cap shingles as shown in Fig. 1, from 12" X 36" square butt shingle strips.	NOTE: Shingles may be cut with tin snips or with a knife when using a knife, marking and cutting should be done on the back side.
2. Strike a chalk line on one side of the hip or ridge at a distance equal to one-half the width of the cap shingles.	NOTE: In cold weather it may be necessary to warm the shingles in order to have them bend without breaking.



NOTE: Begin at the bottom of the hip or at one end of the ridge.

Fig. 1.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
4. Position one edge of the cap shingle along the chalk line and drive a nail 6" back from the exposed end and 1" in from the edge.	NOTE: When applying cap shingles on hips the first cap shingle must be cut to follow the eave lines.
5. Bend the shingle over the hip or ridge, keeping the edge of the shingle aligned with the chalk line, and nail the opposite side.	NOTE: Cap shingles on ridges should be laid so the predominant wind blows away from the butt ends rather than against them.
6. Continue to apply cap shingles the full length of the hip or ridge, keeping one edge with the chalk line, maintaining 5" exposure, and fastening with one nail on each side, 6" back from the exposed end and 1" up from the edge.	

METHOD OF EVALUATION:

The instructor will check the finished work for:

1. alignment.
2. neatness.
3. nailing procedures.

JOB: Apply Roll Roofing

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 1 Roll
65 lb. Roll Roofing

EQUIPMENT: As required for the job

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-21

SAFETY PRECAUTIONS:

Be careful not to step on a piece of roofing which has not been nailed in place.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Apply the first course, full width of the sheet so the lower edge will extend over the eave from 1/2" to 5/8".	NOTE: Cut the ends to extend beyond the rake the same amount.
2. Nail along a line about 1" down from the top edge every 16" to secure it while the second course is being placed.	
3. Nail along the eave and the rake approximately 1-1/2" from the edge of the	NOTE: Nails should be placed on 2" centers and slightly staggered to prevent splitting the sheathing board.
4. Apply the second course so that it will lap the first course 2" and nail along the top edge every 16".	
5. Lift the lower edge of the second course and apply lap cement evenly over the upper 2" of the lower course.	NOTE: Use a small brush to spread the cement evenly.
6. Embed the overlapping sheet in the cement and nail through the lap on 2" centers, not less than 3/4" up from the edge of the sheet.	NOTE: Stagger the nails slightly to avoid splitting the roof sheathing.
7. Cut the ends of the second course at the rake and nail in place as with the first course.	NOTE: All end laps should be 6" wide.
8. Cement the full width of the lap.	NOTE: Two rows of nails should be used, located 1" and 5" from the end of the lap with the nails staggered on 4" centers.

COMPETENCE - PROCEDURES/STEPS TEACHING/LEARNING ACTIVITIES

9. Continue in this manner up the roof and trim the last sheet even with the ridge.

10. Cover both sides of the roof in the same manner.

11. Cut strips of roll roofing 12" wide and bend them lengthwise through their centers.

12. Snap a chalk line parallel to the ridge 5-1/2" down on both sides of the roof.

13. Spread a 2" wide band of lap cement on each side so its lower edge is even with the chalk line.

14. Nail the ridge strip in place on each side of the ridge, and space the nails 3/4" above the edges on 2" centers.

15. Strike a line and trim the roofing along the rake to a line.

METHOD OF EVALUATION:

The instructor will inspect the finished work for:

1. appearance.
2. nailing procedure.
3. alignment along rake and eave.

JOB: Apply Wood Roofing Shingles

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: Cedar Shingles

EQUIPMENT: To be selected by students

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-22

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Beginning with a double thickness of shingles at the bottom of the roof, let the butt end of the shingles protrude 1-1/2" beyond the lower edge of the roof sheathing and about 3/4" beyond the rake (gable end).	NOTE: A metal drip edge along the rake will help to divert the water away from the sidewalls and will provide a good straight edge to follow.
2. Nail shingles with two (2) rust resistant nails in each shingle, spacing the nails about 1" from the edge and 1-1/2" above the butt line of the next course.	
3. Space shingles 1/4" apart to allow for expansion.	NOTE: The joint between shingles should be offset at least 1-1/2" from the joints in the course below. NOTE: Never have two joints in line if separated by only one course of shingles. NOTE: If a valley is involved, shingle away from the valley, selecting and pre-cutting wide valley shingles.
4. Using a board (or boards) as a straightedge to line up the butt end of shingles, tack the board in place with small nails just barely driven into the first layer of shingles or hold shingles in place with tack strips fastened to the straightedge and nailed to the roof sheathing further up the roof.	
5. Nail pre-assembled hip and ridge units in place with 5d nails.	NOTE: Exposure on these hip and ridge units should be the same as the shingles on the main roof.

METHOD OF EVALUATION:

The instructor will check the work as it progresses.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-23

JOB: Apply Cedar Shakes

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: Cedar Shakes as required to complete the job

EQUIPMENT AND TOOLS:

To be selected by student

SAFETY PRECAUTIONS:

Think safety.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Apply a 36" strip of 30 lb. roofing felt along the lower edge of the roof.	
2. Nail the first course of shakes in place with the lower end extending beyond the eaves 1-1/2" and beyond the rake about 1".	NOTE: Use two (2) 6d zinc coated nails in each shake. Spacing between the shakes should be 1/4" to 3/8".
3. Double the first course holding the butt ends with the starter course.	NOTE: Joints should be offset at least 1-1/2".
4. Apply an 18" strip of 30 lb. felt over the top portion of the shakes and onto the roof sheathing.	NOTE: The bottom edge of this strip is placed above the butts a distance equal to twice the exposure.
5. Apply the next row of shakes maintaining 1/4" to 3/8" spacing between shakes and at least 1-1/2" between joints in adjacent rows.	
6. Apply another strip of 30 lb. felt, 18" wide, after applying each row of shakes.	
7. Continue up the roof in the same manner until the ridge is reached.	

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
8. Select shakes of uniform size, trim off the ends even with the ridge, then nail in place.	
9. After both sides of the roof have been covered, apply a strip of 30 lb. felt along the ridge, then finish the ridge with pre-fabricated ridge units.	

METHOD OF EVALUATION:

Check work during application for:
1. appearance.
2. proper procedures.

JOB: Apply Asphalt Roofing Shingles

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: As required for the job

TOOLS: Basic Tool Kit, Tin Snips, Hack Saw

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-24

SAFETY PRECAUTIONS:

1. Care in the use of hand tools.
2. Use extra care when cutting thin metal. The cut edges are sharp.
3. Ladder and scaffold safety.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Install drip edge flashing along the eave.	
2. Install valley flashing (mineral surfaced roll roofing).	
3. Apply felt underlayment.	
4. Install roof edge flashing along the rake.	
5. Cut and bend flashing for chimney, including base flashing and counter flashing (to be installed as roof is being laid).	
6. Cut and bend flashing for against a vertical wall.	NOTE: Step flashing to be installed while roof is being laid.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
7. Cut and apply starter course.	
8. Determine size of end tabs for first course.	
9. Cut starter shingles.	
10. Double the starting course.	
11. Strike chalk lines for aligning shingles horizontally (and vertically on long roofs).	
12. Apply shingles over the entire roof installing the chimney flashing, vent flashing, and flashing against any vertical wall as needed.	
13. Install cap shingles to ridge.	

METHOD OF EVALUATION:

1. Layout
2. Nailing practices
3. Shingle alignment
4. Appearance

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-25

JOB: Apply Building Paper to Sidewalls

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 15 lb. Asphalt Saturated Felt

EQUIPMENT AND TOOLS:

To be selected by the student

SAFETY PRECAUTIONS:

Use proper method of lifting.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut pieces of building paper long enough to extend from corner to corner. 2. Apply the first course, full width of the sheet so the lower edge will overlap the foundation from 1/2" to 3/4".	NOTE: On long walls, paper may be cut into several lengths. End laps should be no less than 4". Allow for this when cutting the paper.
3. Nail (with roofing nails) or staple along the top edge at every stud location. 4. Nail or staple along the ends and bottom about every 8".	NOTE: A chalk line struck on the wall 35-1/2" from the top of the foundation wall will help to align the first course.
5. Apply the second course so it overlaps the first by at least 2", nailing the same as the first course.	NOTE: If the siding is not to be installed immediately, more nailing will be necessary.
6. If doors and windows are present, cut the paper to fit closely around the exterior trim and nail as along the bottom edge.	NOTE: On adjacent sides the paper should be cut to lap around the corners at least 4".
7. Cut the last piece at the top to width and apply behind the frieze (or tight against the soffit if no frieze board is used).	

METHOD OF EVALUATION:

The instructor will check the finished work.

JOB: Construct a Window Frame (Fixed Sash)

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-26

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL:
3/4" White Pine for the Jambs
1 3/4" White Pine for the Sill
Anderson Style Brick Molding for the Exterior Casing
1/2" X 1 3/8" Stops

EQUIPMENT:
Radial Arm Saw
Jointer
Dado Set
Miter Box

SAFETY PRECAUTIONS:

Use care in the use of power tools and machines.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine the size of the sash.	
2. Select material to be used for jambs.	
3. Work jambs to finished width.	
4. Select sill stock.	
5. Work sill stock to finished width and bevel the edges (8-10 degrees).	. SC-2-24
6. Lay out and dado the side jambs to receive the head and the sill (same slope on the sill as the bevel from step #5).	. SC-2-34
7. Cut the head jamb to length.	
8. Cut the sill to length allowing the horns to extend beyond the jamb at least 1" more than the width of the exterior casing.	
9. Nail head jamb and sill into dados in side jambs.	
10. Square and brace the frame.	NOTE: The stops will be applied after the frame has been installed.

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
11. Fit and install exterior casing.	
12. Cut off horns flush with casings.	

METHOD OF EVALUATION:

1. Material selection
2. Layout
3. Accuracy
    a. square
    b. plumb
4. Quality of finished job

JOB: Construct and/or Install an Exterior Door Frame

JOB SHEET IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-27

COURSE: Carpentry

MATERIAL:
1 1/8" White Pine, #1, for Jambs
1 3/4" Oak for Sill
Anderson Brick Molding for Exterior Casings
10d Casing Nails
8d Finish Nails
8d Box Nails

EQUIPMENT:
Radial Arm Saw
Circular Saw
Jointer
Miter Box

TOOLS: Basic Tool Kit

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine width and height of door.	
2. Select materials for jamb, casings, sill.	
3. Work jambs to width.	. SC-2-24
4. Work sill to width and bevel the edge (6° to 8°).	. SC-4-7
5. Lay out and dado side jambs for head and sill (allow 3/4" extra for the threshold).	. SC-2-34
6. Cut head jamb to length.	
7. Cut sill to length allowing the outside projection (horn or ears) to extend past the jamb at least 1" farther than the width of the exterior casing.	
8. Nail the head jamb and the sill into the dados in the side jamb. (8d box nails)	
9. Square and brace the frame.	
10. Install the exterior casings. (8d finish)	. SC-2-17, SC-8-4
11. Cut off the sill projection flush with the outside of the exterior casings.	

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
12. Remove enough of the floor framing (header joist and subfloor) to allow the sill to be set to the proper height.	
13. Apply felt strips alongside and over top of the opening.	
14. Set the frame in the opening, block to proper height and center in the opening.	
15. With the sill in level position from end to end, nail through the side casings near the bottom.	. SC-3-8
16. Plumb the frame in the opening and nail through the exterior casing into the sheathing near the top.	. SC-3-8
17. Use a straight-edge to check the jambs for straight while nailing the remainder of the casings.	
18. Straighten the head jamb, then nail the head casing.	NOTE: Blocking between the jamb and the trimmer stud should be placed at the points where the hinges and the strike plate will be located.

METHOD OF EVALUATION:

1. Size of opening
2. Miters, dados, bevels
3. Nailing practices
4. Plumb and square
5. Height of sill
6. Overall appearance

JOB: Install Window Unit (Manufactured)

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: Window Unit, Preassembled

EQUIPMENT: Scaffolding, Straight-Edge

TOOLS: Basic Tool Kit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-28

SAFETY PRECAUTIONS:

1. Make sure scaffold is safe and to the right height.
2. Do not lift more than you can handle.
3. Do not lift when standing in an awkward position.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Erect scaffolding.	
2. Apply felt strips for flashing.	
3. Place unit in opening and center.	
4. Raise to proper height with wedges.	
5. Level sill and nail side casings at the bottom.	
6. Plumb the unit and nail side casings at the top.	
7. Re-check for level and plumb.	NOTE: Check to see how the sash fits in the frame. If it does not fit, you may need to adjust the frame slightly.
8. Finish nailing side and head casings.	
9. Set all nails.	. SC-8-1
	NOTE: Window is now ready for flashing.

METHOD OF EVALUATION:

1. Window frame plumb, sill and head level
2. Nailing practices

JOB: Install Door Unit (Pre-hung)

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: Pre-hung Exterior Door Unit

TOOLS: Basic Tool Kit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-29

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Prepare the opening by applying felt strips alongside and over the top of the opening.	NOTE: In almost all cases, a pre-hung door unit will have very detailed instructions as to how it is to be hung. It is important that these instructions be followed very carefully.
2. Center the unit in the opening and level the sill.	
3. Nail the side casings at the bottom.	
4. Plumb the unit and nail the side casings near the top.	
5. Check the door to see if it is still properly spaced in the jamb.	
6. Adjust the jamb if necessary to insure the door fitting the jamb.	
7. Complete the nailing of the side and head casings.	
8. Block between the back of the jamb and the trimmer studs at the points where screws are to be installed (usually behind the hinges).	
9. Install screws according to directions.	
10. Remove spacer blocks.	
11. Install lockset and strike plate.	

METHOD OF EVALUATION:

1. Door frame plumb, sill and head level
2. Nailing practices

JOB: Construct and Install an Overhead Door Frame

JOB SHEET IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-30

COURSE: Carpentry

MATERIAL:
1 3/4" White Pine for the Interior Casing
1 1/8" White Pine for the Jamb
Anderson Style Brick Molding for Exterior Casing

EQUIPMENT:
Radial Arm Saw
Jointer
Dado Set
Miter Box

TOOLS: Basic Tool Kit

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check the plans to determine the width and height of the opening.	
2. Select materials for jambs and casings.	
3. Work the jambs to width.	
4. Lay out and rabbet side jambs to receive the head jamb.	
5. Cut the side jambs to length fitting them to the floor.	
6. Assemble the sides and head jamb and check for square and brace.	
7. Apply the exterior casings.	
8. Place the frame in the opening.	
9. Plumb each side and nail through the exterior casing.	
10. Hold the head jamb straight from end to end, then nail the top casing.	
11. Install the interior trim as needed to install the door track.	

METHOD OF EVALUATION:

1. Tight fitting joints
2. Side jambs plumb
3. Head jamb level
4. Frame built according to plan

JOB: Install Drip Caps and Flashings at Doors and Windows

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-31

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: Drip Cap Stock
Pre-shaped Flashing Material

EQUIPMENT AND TOOLS:

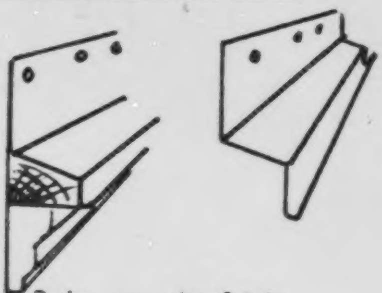
To be selected by the student

SAFETY PRECAUTIONS:

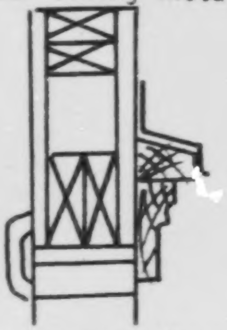
Observe all safety rules.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Measure overall width of window unit across the top of the frame.
2. Mark drip cap stock to this length and cut off with a fine hand saw.
3. Place the drip cap on top of the casing as shown in the sketch at right and nail fast with 6d box galvanized nails.
4. Mark pre-shaped flashing material to the same length as the drip cap and cut off with a pair of tinsnips.
5. Place the flashing on top of the drip cap and press into place.
6. Nail flashing to the wall near the top edge of the flashing as shown in sketch.



NOTE: Drip cap should be cut off exactly flush with ends of outside head casing for easier siding installation.



NOTE: When using the snips, cut only one surface of the flashing shape at a time so as not to crush or distort the flashing.

NOTE: Flashing should lay flat against the drip cap and up against the wall. If the flashing does not lay flat, bend the inner angle open slightly before placing the flashing.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

Drip cap and flashing should be cut neatly, to proper length, correctly nailed and the flashing carefully placed so as to lie flat against drip cap and wall. This will be checked by the instructor.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-32

JOB: Install Overhead Door
UNIT VIII: Exterior Finish
COURSE: Carpentry
MATERIAL: 1 - Roll - Up Type Overhead Door
EQUIPMENT: As Needed
TOOLS: As Needed

SAFETY PRECAUTIONS:

1. Use care in attaching or adjusting the springs used as counterbalances.
2. Follow all directions carefully.
3. Be careful when raising or lowering a door that does not have the springs attached.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Tack door stops temporarily in place.	Detailed directions are packed with all overhead garage doors. They are almost always well illustrated and easy to follow. The procedure for installing a sectional roll-up door includes the following major steps.
2. Mount the vertical track sections to jamb.	
3. Mount the bottom cable bracket to bottom section.	
4. Assemble door sections in opening and attach hinges and rollers.	
5. Mount horizontal track sections.	
6. Raise and prop door in open position.	
7. Attach counterbalancing mechanism (springs).	
8. Close and open door and make adjustments.	
9. Fasten astragal to bottom of door.	
10. Adjust stops for smooth operation and snug fit.	

METHOD OF EVALUATION:

1. Tight fitting joints
2. Side jambs plumb
3. Head jamb level
4. Frame built according to plan

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-33

JOB: Install Belt Course

UNIT VIII: Exterior Finish

COURSE: Carpentry

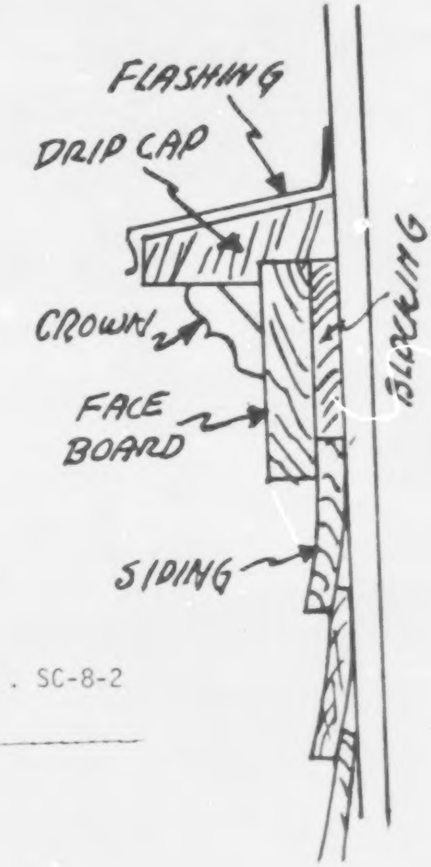
MATERIAL: 3/4" White Pine for Face Board
2" Crown Molding for Bed Molding
1 1/2" X 3" Drip Cap

EQUIPMENT: Radial Arm Saw
Circular Saw
Jointer
Miter Box

TOOLS: Basic Tool Kit

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Apply building paper over the sheathing where the belt course is to be placed.
2. Snap a chalk line to indicate location of the bottom edge of the belt course.
3. Cut pieces of blocking as thick as the top edge of the siding and 1" shorter than the width of the face board.
4. Nail the blocks in place at each stud location holding them up from the chalk line 3/4".
5. Nail the face board in place and miter all joints.
6. Install the drip cap and miter joints at the corners.
7. Install the bed molding and miter all joints.
8. Install the flashing.



. SC-8-2

METHOD OF EVALUATION:

1. Layout
2. Alignment
3. Nailing practices
4. Quality of finished job

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-34

JOB: Apply Corner Boards

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL:
#2 White Pine Lumber
10d Casing Nails
15 lb. Asphalt Felt

EQUIPMENT:
Block Plane
Jointer
Utility Knife
Radial Arm Saw
Table Saw

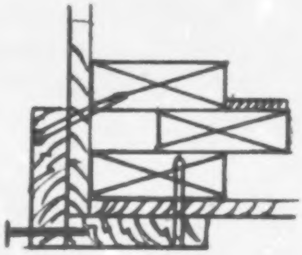
TOOLS:
Hammer
Nail Set
Scribers
Rule
Crosscut Saw
Pencil

SAFETY PRECAUTIONS:

Observe all safety rules.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Give bill of materials to instructor before beginning work.
2. Apply felt strip to corner of building.
3. Select materials and cut to rough size.
4. Straighten one edge of both pieces and work to finish dimensions.
5. Bevel edge of narrow strip.
6. Fit top end of narrow strip, mark bottom and cut to length.
7. Nail narrow strip in place. See sketch.
8. Fit top end of wide board, hold in place, mark and cut to length.
9. Nail wide board in place.
10. Set all nails.



NOTE: Finished corner board should be ready for painting or finishing as specified.

METHOD OF EVALUATION:

1. Tight fitting joints
2. Correct dimensions
3. Final appearance

JOB: Install Gable Louver

UNIT VIII: Exterior Finish

COURSE: Carpentry

EQUIPMENT: Scaffolding
Ladder

TOOLS: Basic Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-35

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set the louver in the opening and center between the rakes with point of louver in center of ridge.	
2. Nail the sill into the subsill. Block between the sloping jamb and the rafter and nail near the top of the louver.	

Fig-1.

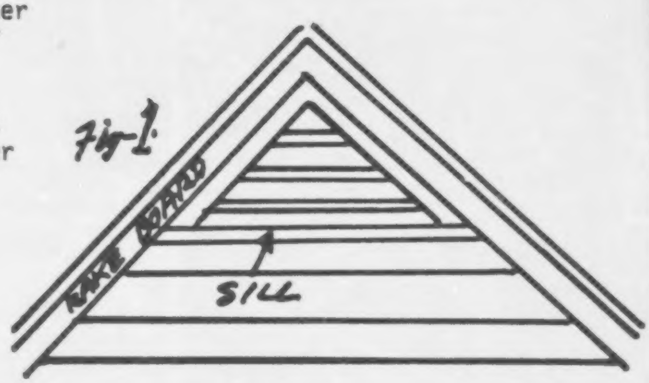
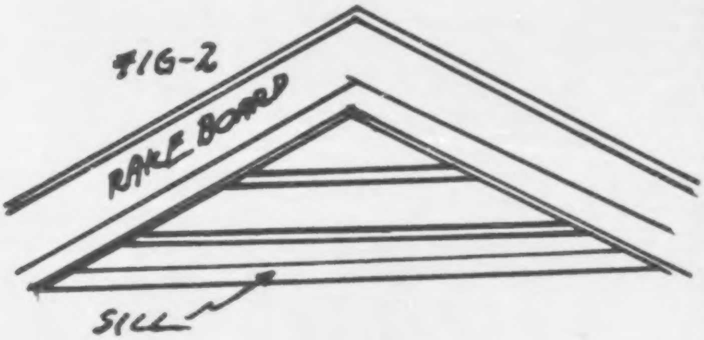


FIG-2



NOTE: Fig. 1 and Fig. 2 show two different installations:
Fig. 1--without frieze board
Fig. 2--with frieze board

NOTE: The procedure for installing the louver is basically the same as for exterior window frames.

METHOD OF EVALUATION:

1. Layout
2. Accuracy of cuts
3. Installation practices
4. Appearance

JOB: Make A Siding Story Pole

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 1 X 2 White Pine

TOOLS: Dividers
Basic Hand Tools

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-36

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Secure a piece of straight 1" x 2" stock that is free of large knots, and equal to the wall height.	
2. Take measurements from 1/2" below the top of the foundation wall to the underside of the window sills, to the top of the door and window drip caps and to the underside of the frieze board or plancier.	
3. Lay off these same measurements on the 1" x 2", carefully marking the distance from the bottom of the story pole to the underside of the window sills and the top of the doors and windows. Also mark off the distance to the frieze board or to the plancier if there is no frieze board.	NOTE: The distance to the bottom of the windows will vary if different length windows are in use; however, all doors and windows should be set to the same height, so the tops of all door and window frames are at the same height.
4. Mark square lines around the siding pole at each of these points and identify the sill mark with "S" and the head with "H".	
5. Set a pair of wing dividers to the recommended exposure for the size to be applied , and with this setting, step off the first distance from the bottom of the rod to the underside of the window sill, adjusting the dividers until the space can be stepped off evenly.	
6. When the dividers are properly adjusted, step off the distances once more and mark each step with a line across the face of the 1" x 2".	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
7. Repeat this job with the space between the sill and drip cap and the frieze or plancier.	NOTE: The siding story pole is then ready to use.

METHOD OF EVALUATION:

Check layout for correct spacing.

JOB: Make a Siding Hook

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 1 piece, White Pine, 3/4" X 2 1/2" X 10"

EQUIPMENT: To be selected by the student

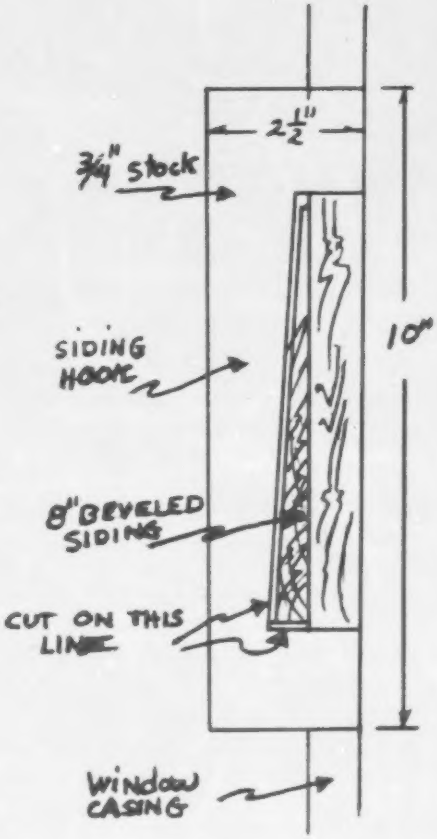
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-37

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

1. Secure a piece of soft white pine 3/4" x 2-1/2" x 10".
2. On side of the stock, scribe a line from the edge a distance equal to the thickness of the window casing.
3. Measure in from each end along this line and mark 1-1/8", leaving about 7-3/4" between marks (for 7-1/2" siding).
4. Hold a small piece of the beveled siding along the scribed line between these marks (as in the position shown in the sketch at right) and mark around the siding.
5. Mark square lines from the back edge of the hook at the top and bottom of the siding (the 1-1/8" marks from each end).
6. With a fine saw, cut along the lines just above and below the siding.
7. With a coping saw, cut out along the slanted line, as indicated in the sketch.
8. Sand the hook smooth and round edges slightly making siding hook ready for use.



METHOD OF EVALUATION:

The instructor will check the finished hook.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-38

JOB: Apply Horizontal Siding

UNIT VIII: Exterior Finish

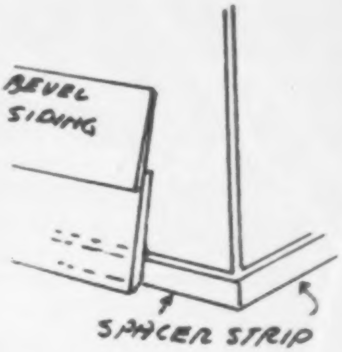
COURSE: Carpentry

EQUIPMENT: Trestles and Plank Scaffold

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

Use general safety precautions in the use of hand and power tools.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check wall surface to make sure sheathing is properly nailed.	
2. Apply sheathing paper to board sheathing.	NOTE: On plywood, sheathing paper is not required.
3. Prepare siding lay out rod. (story pole)	
4. Apply spacer strip at bottom of wall.	
5. Transfer story pole layout to corners of building and to edges of door and window frames.	
6. Place beveled siding on saw horses and gage siding for proper exposure to weather then check story pole layout.	
7. Determine position of first row of siding and snap a chalkline where top edge of first row will be.	
8. Cut and fit first row of siding and fasten in place.	. SC-8-6, SC-8-7
9. Cut and fit succeeding rows and nail in place.	
10. Adjust gage lines on siding to correspond to story pole layout.	
11. Make miter joints at outside corners or apply metal or vinyl corner caps.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

1. Layout
2. Selection of siding
3. Alignment of each row
4. Nailing practices
   a. tight fit
   b. absence of hammer marks
5. Appearance of finished job

JOB: Apply Vertical Siding (Aluminum)

UNIT VIII: Exterior Finish

COURSE: Carpentry

EQUIPMENT: Trestles and Plank
Scaffolding

TOOLS: Basic Hand Tools
Power Tools for Fine Work

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-39

SAFETY PRECAUTIONS:

1. General safety precautions for hand and power tool work
2. Observe safety precautions when working on scaffold.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check sheathing and apply sheathing paper.	
2. Cut outside and inside corner pieces to length and fasten in place.	. SC-8-2
3. Cut and fit window trim and flashing.	. SC-8-2
4. Install starter flashing strip along bottom of wall.	. SC-8-2
5. Starting at one corner, cut siding to length and fasten in place.	NOTE: Do not splice vertical siding.
6. Continue to cut and fit siding and fasten in place carefully connecting each piece of siding to the previous piece, until wall is complete.	NOTE: The carpenters level should be used frequently to make sure the siding is perfectly plumb. . SC-8-11
7. Cut and fit siding into corners and into door and window moldings.	NOTE: Where the manufacturers instructions are included in the package they should be followed.
8. Apply caulking compound where needed.	

METHOD OF EVALUATION:

1. Layout
2. Selection of siding
3. Alignment of each row
4. Nailing practices
   a. tight fit
   b. absence of hammer marks
5. Appearance of finished job

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-40

JOB: Apply Panel Siding

UNIT VIII: Exterior Finish

COURSE: Carpentry

EQUIPMENT: Trestles
Scaffold and Plank

TOOLS: Hand and Power Tools for Exterior Finish

SAFETY PRECAUTIONS:

Care in use of tools and working on scaffolds.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check sheathing and apply sheathing paper if needed.	
2. Start at corner and fit first panel.	. SC-8-7
3. Set first panel in place and check for plumb and level.	
4. Fasten panel with the proper nails.	
5. Cut and fit panels around openings and in gables.	
6. Cut and fit corner moldings and fasten in place.	
7. Cut battens to length and install.	

METHOD OF EVALUATION:

1. Layout
2. Selection of siding
3. Alignment of each row
4. Nailing practices
    a. tight fit
    b. absence of hammer marks
5. Appearance of finished job

JOB: Apply Wood Shingle Siding

UNIT VIII: Exterior Finish

MATERIAL: Cedar Shingles - 16", as required to complete the job

EQUIPMENT: To be selected by the student

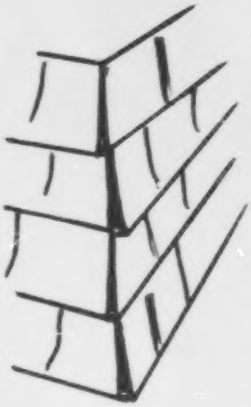
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-41

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check sheathing to make sure it is properly nailed and even.	
2. Apply building paper.	
3. Make a siding story pole.	
4. Fasten a 4" or 5" wood shingle at each end of the wall to be covered, so that the butt projects 1/2" below the top of the foundation.	NOTE: Wood shingle siding should be applied with a maximum weather exposure of 1/2" less than 1/2 the length of the shingle. For a 16" shingle, this would be 1/2" less than 8" or 7 1/2".
5. Attach a taut dry line to the bottom of these shingles.	
6. Fasten a third shingle at the middle, slightly above the line so as to remove the sag when the line is attached to this shingle.	The exposure can be adjusted to work out to the bottom and top of windows and doors.
7. Fill in the first course of shingles to the line but not touching the line.	NOTE: Use only 2 nails per shingle.
8. Apply a second course of shingles directly over the first course.	NOTE: Make sure that all vertical joints in the second course are at least 1-1/2" from a joint in the course below.
9. With the siding story pole, prepared in step 3, mark off several courses up along each corner of the building measuring from the butt of the double starter course just completed.	
10. Snap a chalkline at the butt line of the third course of shingles (7-1/2" above the butt line of the course below).	NOTE: An alternate procedure is to tack a 10' straightedge along the chalkline and set the shingles on this straightedge until they are nailed fast.
11. Apply the third course of shingles to this line following the same general procedure as for course number 2.	

12. Continue to apply shingles as described above, cutting and fitting around frames, etc., until the wall is covered.

13. Finish the corners by alternating the direction of lap on successive courses.



NOTE: The edges of the overlapping shingles should be flush with the face of the shingle on the adjacent wall.

METHOD OF EVALUATION:

1. Layout
2. Selection of siding
3. Alignment of each row
4. Nailing practices
    a. tight fit
    b. absence of hammer marks
5. Appearance of finished job

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JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-42

JOB: Construct Porch Floor

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 2 x 8 Joist
1 x 8 Trim
1" x 3 1/4" Flooring

EQUIPMENT: Saw Horses
Extension Cord
Portable Electric Saw

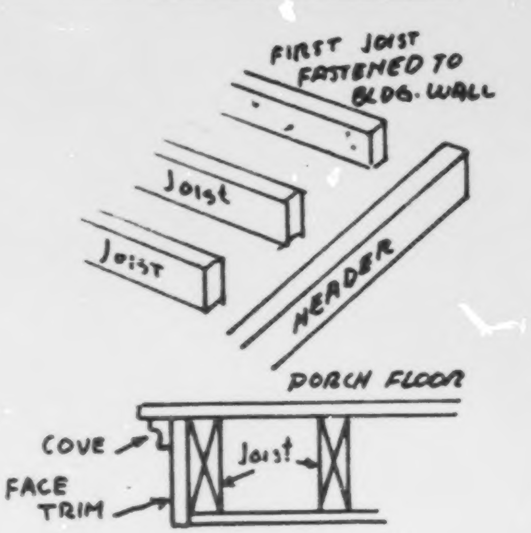
TOOLS: Hand Tools for Framing

SAFETY PRECAUTIONS:

1. Use the same precautions recommended for working on the house frame itself.
2. Use care in working with power tools.
3. Keep sharp blades.
4. Beware of frayed or broken extension cords.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Check drawing for porch dimensions and design. Look for porch details, if any.
2. Check foundation wall or piers for dimensions and accuracy.
3. Prepare nailer and fasten nailer to building wall.
4. Frame and set intermediate girder(s).
5. Prepare and set joist headers.
6. Make floor joist pattern.
7. Mark and cut number of joist required.
8. Install block or cross bridging, if required.
9. Fit and install face trim around floor framework.



METHOD OF EVALUATION:

1. Interpretation of drawing
2. Layout
3. Accuracy
   a. cuts
   b. alignment
   c. Plumb and level
4. Quality of finished floor

JOB: Construct A Porch Beam (Chord)

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL:
2 X 10's
2 X 4 Blocks
2 X 4 Temporary Columns
10d Common Nails
16d Common Nails

EQUIPMENT: Scaffolding

JOB SHEET
IDENTIFICATION CODE

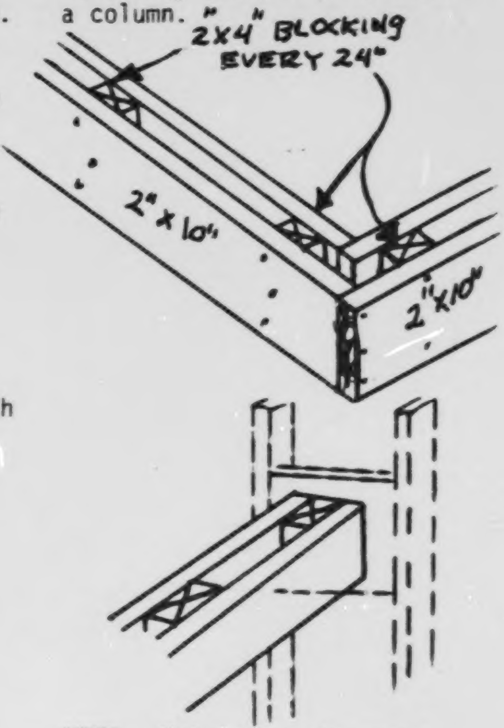
JOB NUMBER: J-8-43

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Study detail drawings to determine dimensions and arrangement of parts.
2. Select lengths of 2" x 10" or as required in the drawings and cut them to length.
3. Cut 2" x 4" blocking as shown in sketch at right and nail them to the side of the 2" x 10"'s about every 24".
4. Set up and brace a temporary support or set permanent columns in place and secure with temporary braces.
5. Set the 2" x 10"'s with the 2" x 4"'s attached in place on the columns and fasten them with toenails.
6. Cut the outside 2" x 10" members to length and set in place.
7. Fasten the 2" x 10"'s to the 2" x 4" blocking and nail the corners together.
8. Nail the ends of the beam to the house frame as shown in detail drawings.

TEACHING/LEARNING ACTIVITIES

NOTE: The 2" x 10"'s making up the beam should be full length if possible, but if not, they should splice over a column.



NOTE: Make sure the crown edge of the 2" x 10" members are up.

METHOD OF EVALUATION:

The job will be checked for accuracy as work progresses for:
1. procedure.
2. placement of members.
3. accuracy.

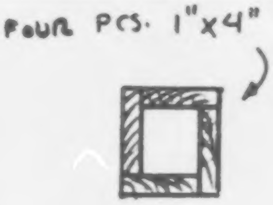
JOB:	Construct and/or Set Porch Posts or Columns	JOB SHEET IDENTIFICATION CODE
UNIT VIII:	Exterior Finish	JOB NUMBER: J-8-44
COURSE:	Carpentry	
MATERIAL:	1 X 4 White Pine 8d Box Nails	
TOOLS:	As selected by the student	

SAFETY PRECAUTIONS:

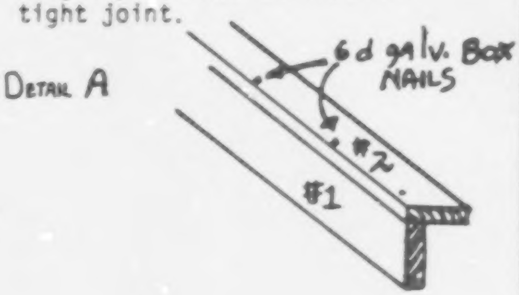
Porch roof must be supported with temporary props when removing or installing columns

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Check drawings for size of column, special details and location.
2. If a plain column about 4" square is required, select four pieces of straight 1" x 4" of good quality and cut them about 1" longer than needed, so they can be squared and cut to length after they are assembled.
3. Start by nailing piece #1 to the edge of piece #2 as shown in Detail A, making sure the edge of one piece is exactly even with the face of the other piece and nail from one end to the other, aligning the pieces as you nail.
4. Align and nail piece #3 to the edge of piece #2 as shown in Detail B.
5. Align and fasten side #4 in place and then nail side #4 to the edge of side #3 and side #1 to side #4.
6. Sand column smooth and clean.
7. Square and cut one end of the column and mark off the correct length. If the porch floor has a slope be sure to take measurements to the long point and cut the bottom of the column to correspond to this slope.



NOTE: The column should be nailed with 6d or 8d galvanized box nails and the edges to which a side is nailed should be perfectly square or very slightly beveled to insure a tight joint.



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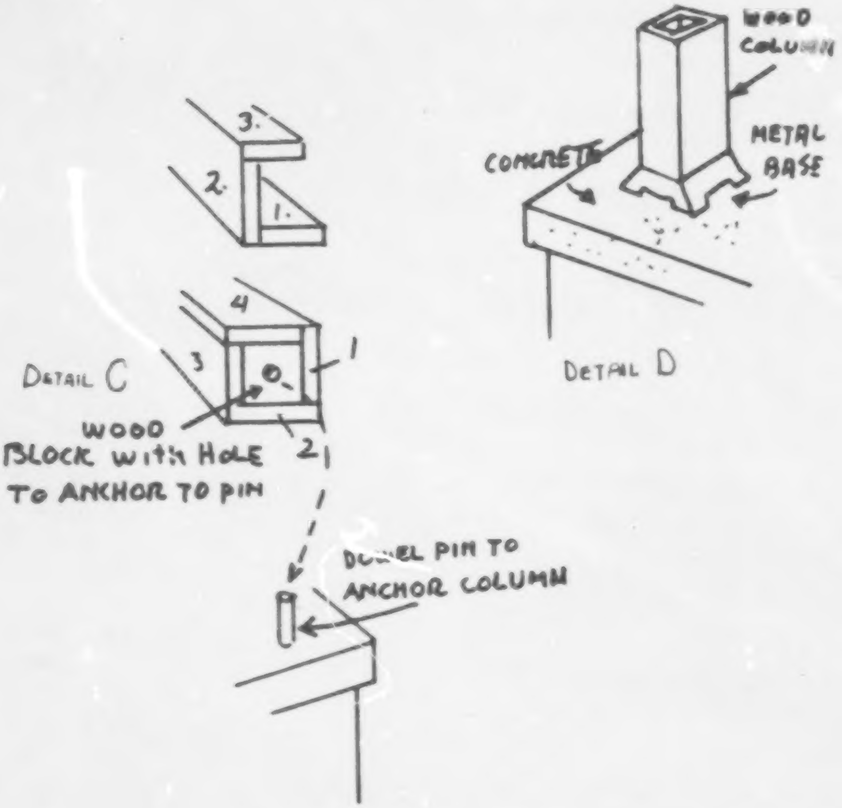
8. Set column in place and check for correct length and fit. Fasten the top with 6d or 8d galvanized finish nails.
9. Using a straightedge and level or a plumb bob set the column plumb and fasten to the porch floor.

NOTE: If the porch floor is concrete a special metal base may be used to set the column on keeping it from coming in contact with the concrete, and providing anchorage. Also a block of wood may be set inside the column at the bottom. A hole in the block and a corresponding hole in the concrete, to recieve a 1/2" metal dowel pin will serve to anchor the column at the bottom. Detail C.


3.
2.
1.
4
3
1
2
DETAIL C
WOOD BLOCK WITH HOLE TO ANCHOR TO PIN
DOWEL PIN TO ANCHOR COLUMN
WOOD COLUMN
CONCRETE
METAL BASE
DETAIL D

METHOD OF EVALUATION:

The instructor will observe and inspect work for:

1. dimensions.
2. tight fitting joints.
3. straightness.
4. proper installations.

JOB: Install Porch Trim (Cornice and Columns)

JOB SHEET IDENTIFICATION CODE

UNIT VIII: Exterior Finish

JOB NUMBER: J-8-45

COURSE: Carpentry

MATERIAL:
1" x 4" Fascia
1" x 6" Plancier and Soffit
1" x 8" Facing

EQUIPMENT:
Portable Saw
Stepladder
Scaffold
Extension Cord
Trestles

TOOLS: Hand Tools for Finish Carpentry

SAFETY PRECAUTIONS:

1. Use all precautions while working on scaffolds and framework.
2. Use care not to drop or throw down tools or materials.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Study the cornice detail drawings.	
2. Fit and install the fascia.	. SC-2-33
3. Install soffit material (including soffit vents).	
4. Fit and install porch beam soffit.	
5. Fit and install beam facing. (outside)	
6. Fit and install beam facing (inside).	
7. Install bed molding.	. SC-8-5
8. Apply porch ceiling material.	
9. Fit and install ceiling molding.	. SC-8-5
10. Prepare material for porch columns.	
11. Construct porch columns.	
12. Set and secure columns.	

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Accuracy of cutting and fitting
3. Appearance of trim

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-46

JOB: Build and Install Porch Steps

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 2" x 10" Stock (Carriage)
1" x 8" Stock (Risers)
5/4" x 6" Stock (Treads)

EQUIPMENT: Portable Power Saw
Trestles
Extension Cord

TOOLS: Framing Square and Clamps
Hand Tools for Finish Work

SAFETY PRECAUTIONS:

The usual precautions while using tools and equipment, and especially while using power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Study plans and determine rise and run dimensions.	
2. Lay out stair carriage.	NOTE: Make adjustments for tread and riser thickness.
3. Prepare risers.	
4. Prepare treads.	
5. Assemble steps.	
6. Prepare base for supporting steps (or rest on sidewalk).	
7. Set steps in position and check for level, both length and width of treads.	NOTE: Treads should have slight pitch forward.
8. Secure steps with suitable hangers or fasteners.	
9. Sand work and set nails.	

METHOD OF EVALUATION:

1. Interpretation of drawing
2. Layout
3. Accuracy
    a. cuts
    b. fit
    c. assembly
4. Quality of product

JOB: Build and Install Porch Railing

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-8-47

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 2" x 4" Top Rail
2" x 3" Bottom Rail

EQUIPMENT: Portable Power Saw
Miter Box
Extension Cord

TOOLS: Hand Tools for Finish Work

SAFETY PRECAUTIONS:

1. Use care while working around porch floor
2. Use care in handling tools, equipment and materials

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out position of top and bottom rails on the columns.	
2. Cut and fit top rail and fasten in place.	
3. Cut and fit bottom rail and fasten in place.	
4. Lay out for intermediate rail or design.	
5. Fit and install intermediate rail or design.	
6. Fit and install center support under bottom rail where required.	
7. Sand work and set nails.	

METHOD OF EVALUATION:

1. Interpretation of drawing
2. Layout
3. Accuracy
    a. cuts
    b. fit
    c. assembly
4. Quality of product

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-48

JOB: Build Storm Sash or Window Screen

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: White Pine, #2, 1 X 2 1/2 X 8'0"
Plastic Resin Glue
3/8" Dowel

EQUIPMENT: Doweling Jig

TOOLS: As selected by student

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut pieces of stock to rough length.	. SC-2-25
2. Straighten one edge of all pieces on jointer.	. SC-2-24
3. Rip all pieces 1/16" wider than finish width.	. SC-2-23
4. Joint second edge of all pieces.	. SC-2-24
5. Cut all pieces to length.	. SC-2-25
6. On the face of stiles, lay out position of top, bottom and center rails.	
7. Place all pieces in position and clamp lightly with bar clamps.	
8. Mark position of dowels on face side of all members at the joints. (Fig. 3)	
9. Use doweling jig to drill for 3/8" dowels.	REFERENCE: Stanley Instructional Chart #27, Stanley Tool Guide "How To Use the Stanley Doweling Jig".
10. Cut dowels to length (2 1/2").	

11. Insert dowels in holes and assemble without glue to test for fit.
12. Disassemble and adjust for fit if necessary.
13. Apply glue to holes and dowels.
14. Insert dowels and reassemble.
15. Clamp and check for square.
16. Store to dry.

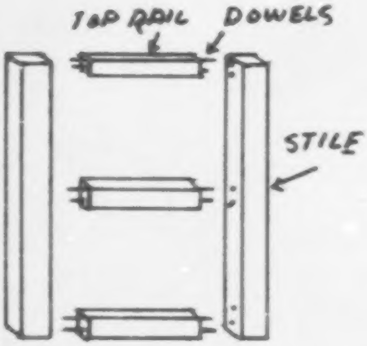


Fig-1

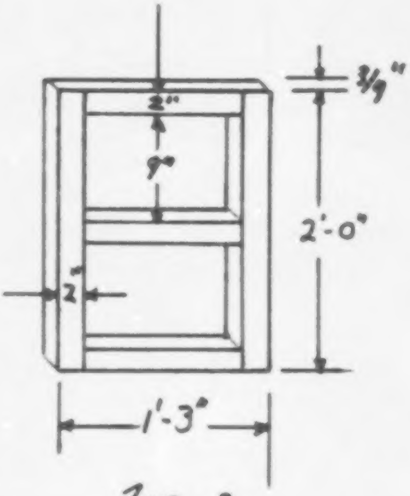


Fig-2

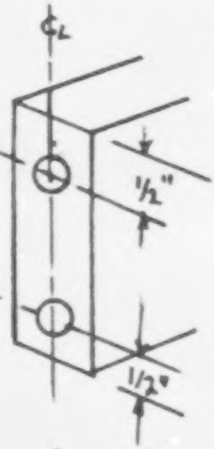


Fig-3

METHOD OF EVALUATION:

1. Interpretation of drawing
2. Layout
3. Accuracy
    a. cuts
    b. fit
    c. assembly
4. Quality of product

JOB: Cut Glass and Glaze A Window

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-8-49

UNIT VIII: Exterior Finish

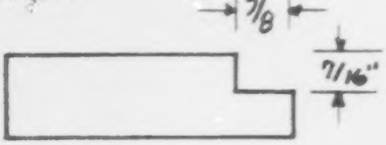
COURSE: Carpentry

MATERIAL: 1 piece, Glass, Single Strength, 10" X 12"
Glazing Compound
Glaziers Points

EQUIPMENT: Router
Frame from J-8-48

TOOLS: Putty Knife
1" Wood Chisel
Glass Cutter

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. After the glue has dried, use the router to rabbet the bottom half of the frame for glass as shown in Fig. 4.	. SC-2-35, SC-2-36
2. Square up all corners with a wood chisel.	
3. Cut a piece of glass for the opening.	. SC-8-9
4. Install the glass and glaze the window.	. SC-8-10



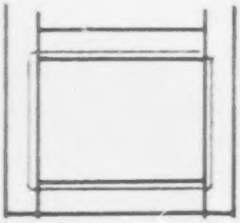

BOTTOM HALF RABBETED FOR GLASS

Fig. 4

METHOD OF EVALUATION:

Appearance

JOB: Apply Screen Wire To A Wood Frame

UNIT VIII: Exterior Finish

COURSE: Carpentry

MATERIAL: 1 piece, Screen Wire, 12" X 16"

TOOLS: Stapler
Miter Box
Unility Knife

JOB SHEET
IDENTIFICATION CODE

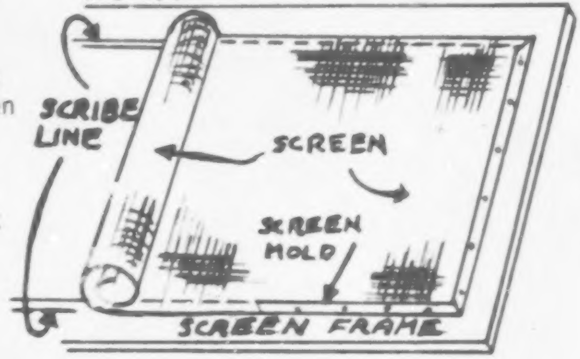
JOB NUMBER: J-8-50

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Measure opening in screen frame and cut screen wire to size.
2. Scribe a line around the frame opening a distance equal to the width of the screen molding.
3. Tack or staple the screen along one end of the frame stretching the screen taunt as you tack. Make sure screen edge is inside scribe line.
4. Stretch and tack screen along one side again keeping the edge of the wire just inside the scribe line.
5. Stretch and tack screen along opposite side, firmly but carefully stretching screen across and down at the same time tacking.
6. Stretch the screen toward the last end and fasten.
7. Cut screen molding to length mitering them at the corners and keeping the molding even with the inside edge of the frame. Make sure miters fit properly.

TEACHING/LEARNING ACTIVITIES

NOTE: Use the following procedure to attach screen wire to the upper half of the frame made in J-8-48 and glazed in J-8-49.



NOTE: The screen can be stretched by gripping between thumb and finger and pulling screen tight. If a sharp punch or scratch awl is used to stretch the screen, care must be taken not to tear the screen.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Use 3/4" or 1" x #18 brads to fasten screen molding in place, covering the edge of the screen that overlaps the frame.	NOTE: Any excess screen left beyond the scribe line may be cut off with a sharp utility knife and a metal straightedge held just inside the scribe line. The extra screen may also be cut off after the screen molding is in place by carefully cutting along the outside of the screen molding.

METHOD OF EVALUATION:

The instructor will observe work in progress and inspect final results.

JOB: Install Flexible Insulation

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Rolls of Flexible Insulation
Supply of Staples

EQUIPMENT: Staple Tacker
Stepladder
Trestles
Several 8' Boards or Planks

TOOLS: Hand Saw
Utility Knife

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-1

SAFETY PRECAUTIONS:

1. Prolonged work around insulation material may cause irritation to the skin and of the respiratory system for those who are allergic to such materials.
2. Keep sleeves rolled down, collars buttoned and use a respirator.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Unroll insulation onto planks placed on trestles.	
2. Measure space and cut insulation to proper length for regular stud spaces.	NOTE: Add 1" at each end (2" over all) to allow for tacking flange across the ends. See Fig. 1.
3. Hold insulation in place and staple fast.	
4. Cut and fit insulation into narrow or odd spaces and staple in place.	NOTE: Use downward strokes only cutting close to the ends of the planks.
5. Work insulation material into narrow spaces around doors and windows.	NOTE: Make sure insulation fits snugly against the sides of all framing members, and that there are no gaps in the tacking flange. Also make sure that there is a tacking flange around all edges of the insulation. See Fig. 2.
6. Cover these spaces with vapor barrier.	

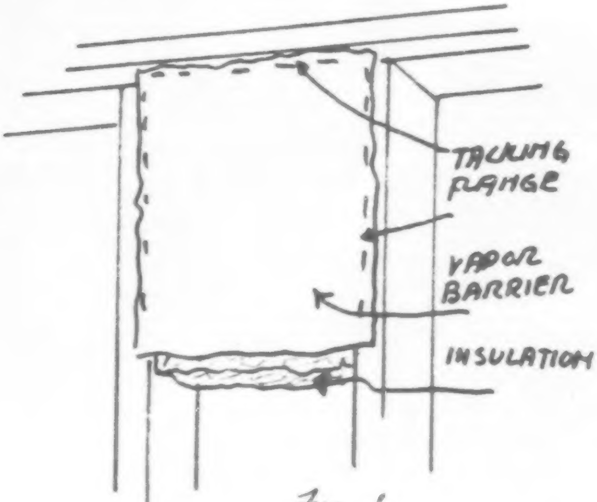

TACKING FLANGE
VAPOR BARRIER
INSULATION

Fig. 1.

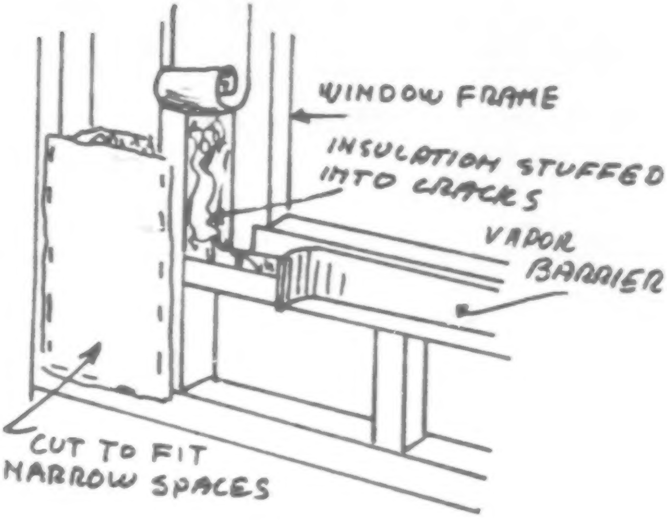

WINDOW FRAME
INSULATION STUFFED INTO CRACKS
VAPOR BARRIER
CUT TO FIT NARROW SPACES

Fig. 2.

METHOD OF EVALUATION:

1. Accuracy of measurements
2. Insulation fit
3. Fastening practices

JOB: Apply Gypsum Lath

UNIT IX: Interior Finish

COURSE: Carpentry

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-2

DRAWING NO: D-9-2

MATERIAL: 1 1/8" Blued Rock Lath Nails
Several Bundles of 3/8" Gypsum Rock Lath

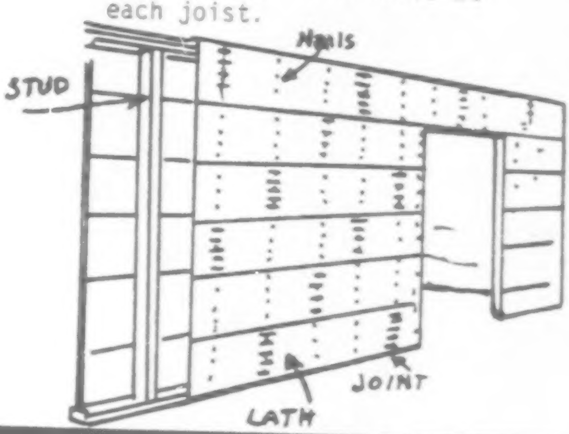
EQUIPMENT: Scaffold if Necessary
Trestles
Stepladder

TOOLS: Hammer
Utility Knife
Old Handsaw or Compass Saw

SAFETY PRECAUTIONS:

1. The usual precautions while working on scaffolds, ladders and trestles.
2. Use care when working with sharp utility knives.

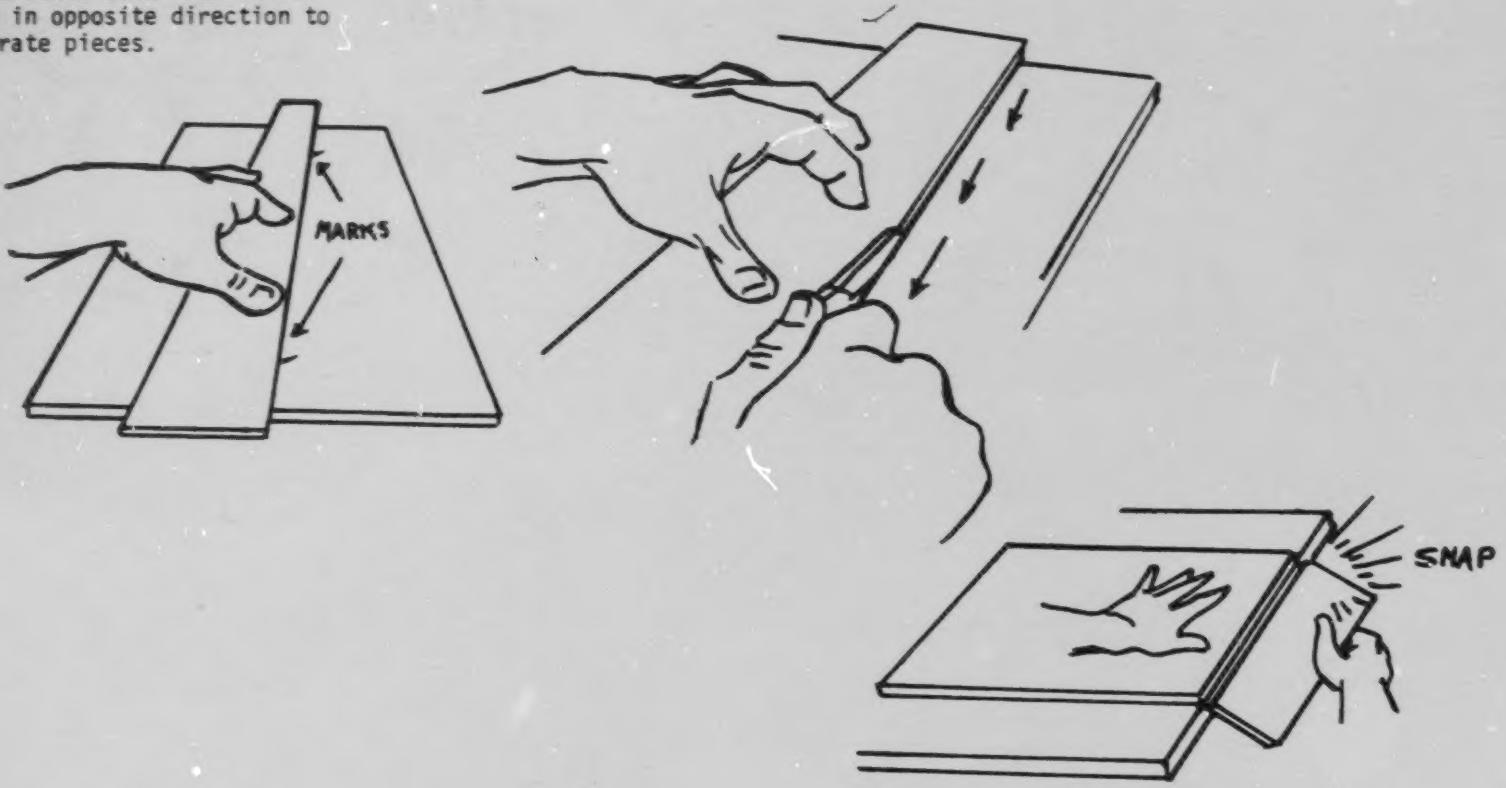
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set up scaffold for working on ceiling.	. IL-9-5
2. Fit and install rocklath across joist at one end of the ceiling.	. D-9-2
3. Continue to fit and install rocklath, breaking joints in each successive row until ceiling is covered.	
4. Beginning at top of side wall, fit and install rock lath across studding against the ceiling. Use full length pieces until cutting is necessary at the ends.	NOTE: Cut rocklath with utillity knife using framing square as a guide. Score one side, snap at score line then score other side with knife. Snap in opposite direction to separate pieces.
5. Continue to fit and apply rocklath, breaking joints in each successive row until each wall is covered. See illustration.	NOTE: On side walls use four nails at each stud. On ceilings use five nails at each joist.
6. Install rocklath in closets.	
7. Allow about 1" space along the bottom of each wall for plaster grounds.	



METHOD OF EVALUATION:

1. Layout of rocklath installation
2. Fastening practices
3. Safety practice

NOTE: Cut rocklath with utility knife using framing square as a guide. Score one side, snap at score line then score other side with knife. Snap in opposite direction to separate pieces.



Cutting Gypsum Board

DRAWING NUMBER
D-9-2

JOB: Install Cornerite and Other Reinforcing for Plaster

JOB SHEET IDENTIFICATION CODE

UNIT IX: Interior Finish

JOB NUMBER: J-9-3

COURSE: Carpentry

MATERIAL: Blued Rocklath Nails
Several Lengths of Cornerite
Flat Metal Lath

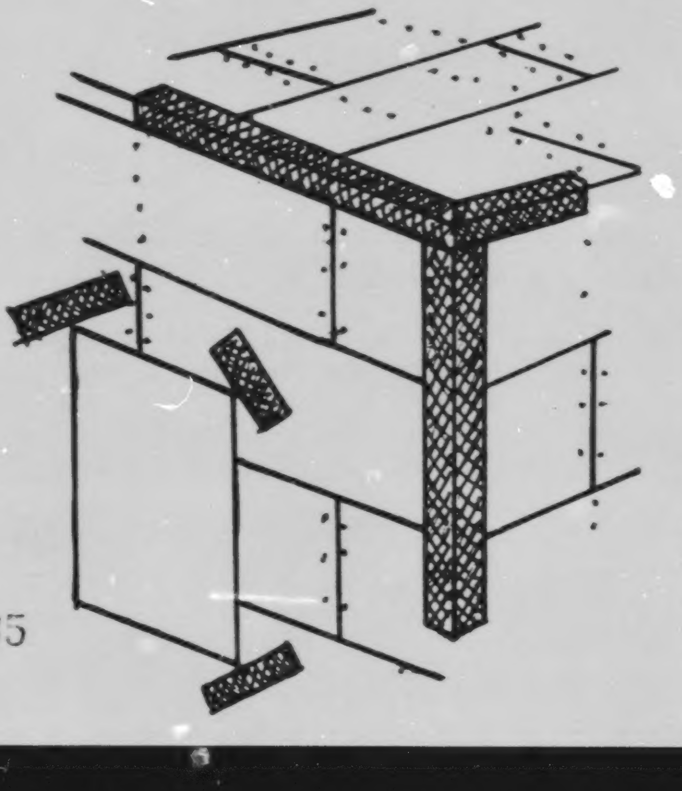
EQUIPMENT: Stepladder

TOOLS: Carpenter's Level
6' Straightedge
Hammer
Rule
Tinsnips

SAFETY PRECAUTIONS:

Use caution when handling and cutting cornerite because of sharp metal edges.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place a piece of cornerite at the ceiling-wall intersection and nail lightly through rock lath into framing (See sketch).	NOTE: Make sure metal lath lays tight against the surface of rock lath. Bend cornerite slightly over 90° so it will spring tightly against the surface as it is pushed into corners.
2. Continue to place cornerite around perimeter of room, overlapping ends 1/2" to 1".	
3. Install cornerite in all vertical corners as shown. Cut cornerite with a pair of tin snips.	
4. Cut pieces of plain metal lath into pieces about 8" x 16".	
5. Fasten these pieces diagonally across the corners of all openings, top and bottom (see sketch).	
6. Cut pieces of metal lath, and fasten them to the surface of the rock lath over large concentrations of horizontal lumber such as built-up flush ceiling beam or corner post at the intersection of interior partitions.	



NOTE: Do not overnail the metal lath as it should be a part of the plaster rather than a part of the base.

METHOD OF EVALUATION:

Work will be checked to see if all corners and around openings have been reinforced and there are no gaps between metal and gypsum lath.

JOB: Install Corner Bead for Plaster

JOB SHEET IDENTIFICATION CODE

UNIT IX: Interior Finish

JOB NUMBER: J-9-4

COURSE: Carpentry

MATERIAL: 1 piece, Metal Corner Bead 8'

EQUIPMENT: Straightedge

TOOLS: Carpenters Level

SAFETY PRECAUTIONS:

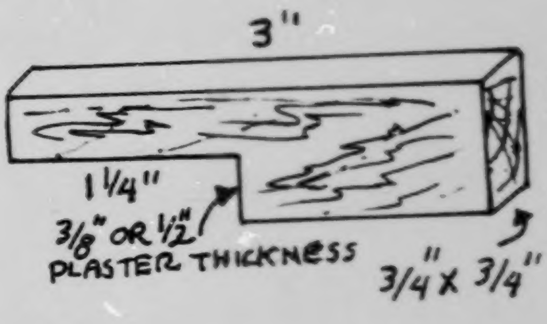
Be careful when handling thin metal material especially after it has been cut.

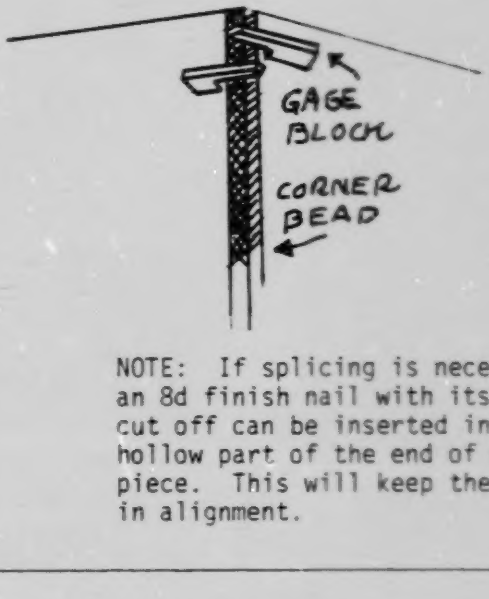
COMPETENCE - PROCEDURES/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

---

1. Cut the piece of corner bead to length with a hack saw or tin snips.
2. Make a gage block as shown at right.
3. Using the gage block as shown in the sketch at right, fasten the top of the corner bead both on the right side and on the left.
4. Repeat this process at the bottom and fasten, as at the top.
5. With a straightedge about 8' long, and a carpenter's level, check the corner bead to see if it is plumb both on the right side and on the left. Make adjustments if necessary to make the corner plumb in both directions.
6. Using only the straightedge, bring the corner bead to the straightedge from both the right side and the left, adjusting and re-adjusting the bead until it is straight for its entire length.





NOTE: If splicing is necessary an 8d finish nail with its head cut off can be inserted into the hollow part of the end of each piece. This will keep the splice in alignment.

METHOD OF EVALUATION:

The work will be checked for plumb and straight in both directions and for correct plaster thickness.

JOB: Install Plaster Grounds

UNIT IX: Interior Finish

COURSE: Carpentry

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-5

MATERIAL: 1" x 2" Stock for Grounds
7/8" x 1" Strips for Grounds
4d Box Nails

EQUIPMENT: Stepladder
Straightedge

TOOLS: Carpenters Level
Handsaw
Hammer
Rule

SAFETY PRECAUTIONS:

Usual precautions while working with hand tools.

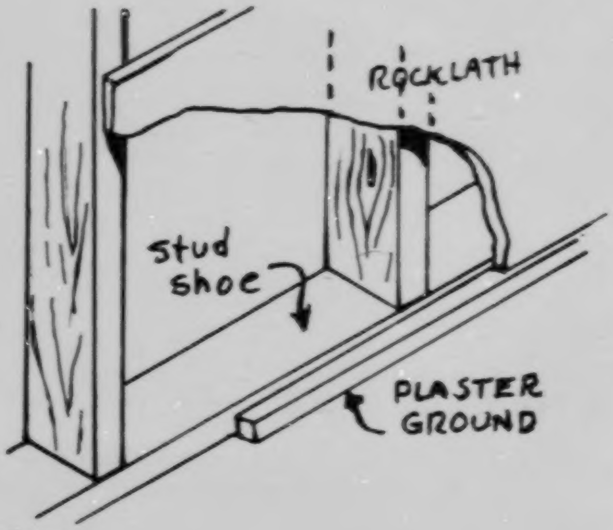
COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Install grounds behind the baseboard by preparing ground strips about 3/4" to 1" wide and equal in thickness to the combination thickness of gypsum lath and plaster (see sketch).
2. Cut the ground strips to length as required and nail them to the wall stud shoe, as shown.
3. Cut the ground strips off flush at openings.
4. Install grounds around door openings by preparing the strips 3/4" thick by 1-3/4" to 2" wide. It will require four pieces the height of the opening and two pieces the width of the opening.
5. Nail a ground strip on the inside face of one of the 2" x 4"'s in the door opening. Let the edge project beyond the face of the gypsum lath equal to the plaster thickness (usually 1/2"). Use a gage block at the top and bottom of the strip (see gage block used in J-9-4).

TEACHING/LEARNING ACTIVITIES

NOTE: Grounds are usually placed at the bottom of the wall along the floor (behind the base). When special wide ornamental baseboard is used, the architect may specify a ground strip near the top of the base as well.

NOTE: Use 4d finish or box nails.



COMPETENCE - PROCEDURES/STEPS

6. When the top and bottom of the strip has been set and fastened, check for plumb with a straightedge and level.

7. Once the ground strip is fastened top and bottom and checked for plumb, hold a straightedge to the strip and make it straight from top to bottom and nail every 12".

8. Make a second gage block as shown at right. The notch in the gage block will be equal to the total wall thickness from the face of the plaster on one side of the wall to the face of the plaster on the other side.

9. Using the gage block, hook it over the first ground strip set the second group strip parallel to the first.

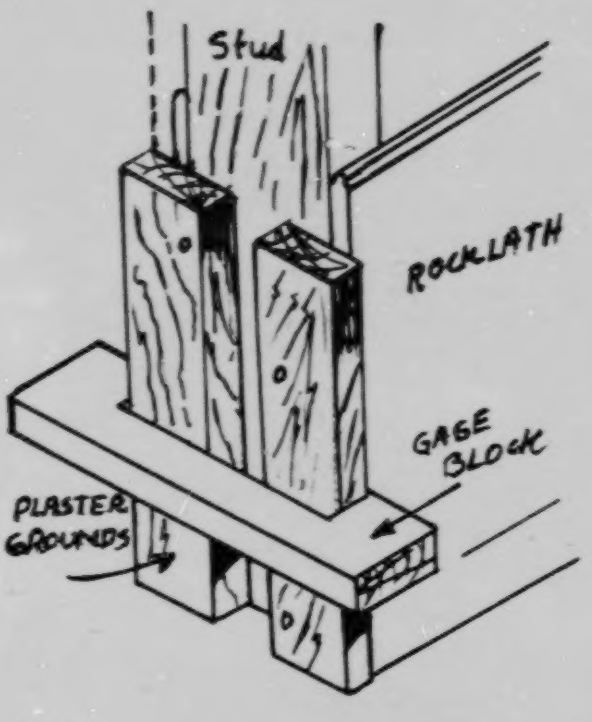
10. Repeat the above procedure and place two ground strips on the face of the 2" x 4" at the opposite side of the opening.

11. Cut two pieces of ground strip to length to fit between the side strips. Line them up with the edge of the side strips and nail them to the underside of the opening header.

12. Check all grounds to make sure they are plumb, level, straight and set with the proper projection to conform with specified plaster thickness.

TEACHING/LEARNING ACTIVITIES

NOTE: Only slight adjustments can be made when checking for plumb, otherwise, the thickness of the plaster will be greatly affected.



METHOD OF EVALUATION:

Students will be observed while at work for skill competency and tests will be given to measure their knowledge and understanding of theory.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-6

JOB: Apply Gypsum Sheetrock

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 4' X 8' X 3/8" Sheets of Sheetrock
1 1/8" Blued Nails

EQUIPMENT: Trestles and Plank for Scaffold

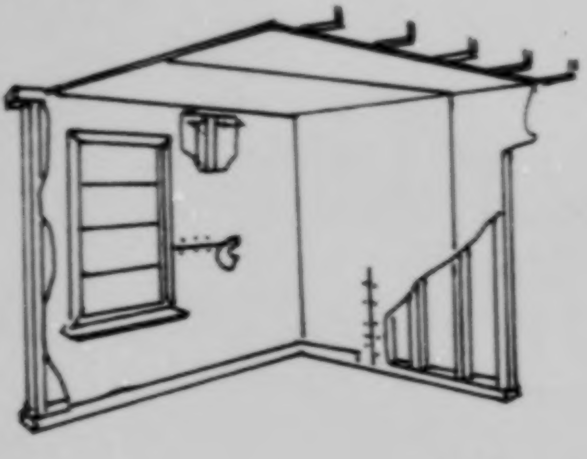
TOOLS: Old Hand Saw for Cutting Plasterboard
Utility Knife
Rule
Hammer
Chalk Line

SAFETY PRECAUTIONS:

Observe the usual safety precautions necessary while working on scaffolds and be careful.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set up scaffold for installing ceiling.	. IL-9-6
2. Check ceiling to make sure joists are spaced properly and straight, and that all nailers are in place.	
3. Take measurements and lay out gypsum wallboard.	
4. Cut sheetrock to size.	NOTE: Gypsum board may be cut with a utillity knife and straightedge or with an old hand saw.
5. Raise sheetrock to ceiling and when in.position set temporary prop.	
6. Fasten plasterboard with plasterboard nails, 1 1/8" glued.	NOTE: Plasterboard should be applied at right angles to the ceiling joist unless full length sheets are available to extend from wall to wall. In this case they may be applied with the joist.
7. Continue to layout and cut plasterboard, applying until ceiling is covered.	
8. Check wall framework to receive plasterboard.	NOTE: The nails should be 8" apart on side walls and 6" apart on ceilings. An alternate method is to place the nails close together (about 1" apart) in pairs every 12" along each framing member.
9. Layout and cut plasterboard to width and/or length if required.	
10. Mark and cut out for openings.	
11. Fasten wallboard in place with plasterboard nails.	
	NOTE: Make sure all end joints are made in nailers or framing members.

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
12. Continue to fit and install sheets until all walls are completed.	



METHOD OF EVALUATION:

1. Preparation
    a. level
    b. layout
2. Accuracy of cuts
3. Alignment
4. Nailing practices

JOB: Install Corner Bead for Plaster Board

JOB SHEET IDENTIFICATION CODE

UNIT IX: Interior Finish

JOB NUMBER: J-9-7

COURSE: Carpentry

MATERIAL: 1 Piece of Metal Corner Bead for Plasterboard

EQUIPMENT: Short Step Ladder

TOOLS: Straightedge and Level

SAFETY PRECAUTIONS:

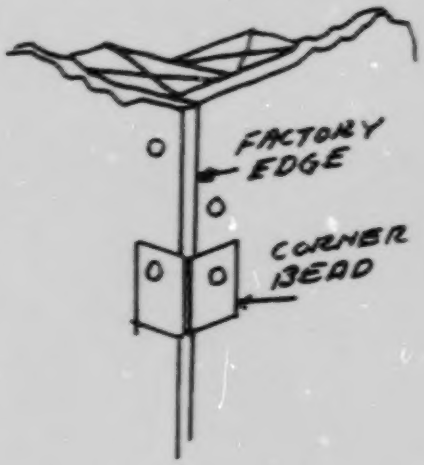
1. Be careful on ladders.
2. A fall from one step up may result in a serious injury.
3. Do not lay tools on top of ladders.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Take measurements and cut the corner bead to the required length.	
2. Place the corner bead over the outside corner to be protected.	
3. Nail the corner bead at the top on both sides.	
4. Likewise, nail the corner bead at the bottom.	
5. Check the corner bead with a straightedge and carpenter's level to see if it is plumb. The corner bead will flex sufficiently so that slight adjustments can be made.	NOTE: A straight corner is easier to make if the sheet of plasterboard which overlaps the adjacent sheet has a factory edge.
6. With the straightedge held to the corner bead and the corner bead adjusted to the straightedge, fasten every 12" with nails.	
7. With a 6" putty knife, apply a coat of ready mixed finish type joint cement to both sides of the corner bead.	

8. Trowel smooth with the putty knife.

9. When first coat of cement is dry, sand smooth and level.

10. Apply a second coat of cement and finish-sand when dry.



METHOD OF EVALUATION:

1. Observation of sequence of installation.
2. Quality of finished job.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-8

JOB: Tape and Finish Gypsum Wallboard

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Roll of Drywall Tape
Can of Premixed Joint Cement

EQUIPMENT: Stepladder

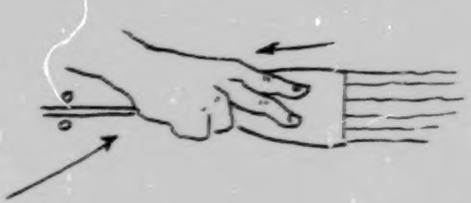
TOOLS: Hammer
Drywall Pan
6" Wide Putty Knife
Medium and Fine Sandpaper

SAFETY PRECAUTIONS:

1. Observe safety precautions while working on ladders.
2. Do not lay tools on top of ladder, especially while moving the ladder.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

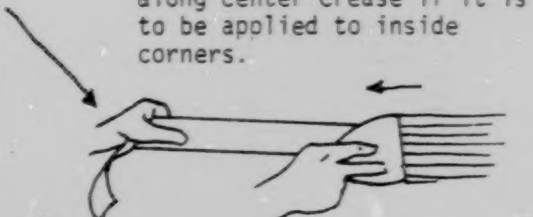
1. Secure the proper tools (wide putty knife and pan) and material (joint cement and perforated paper tape).
2. Cut tape to length.
3. With a 6" putty knife, apply a coat of cement to the joint to be covered.



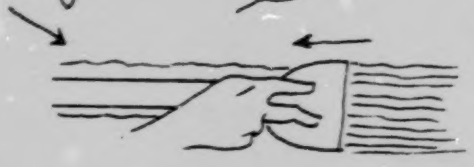
4. Press the tape into this coat of cement, again using the putty knife.

NOTE: Tape must be folded along center crease if it is to be applied to inside corners.

5. Smooth the cement and tape, removing the excess cement. If prefered let this coat dry before applying the next coat.

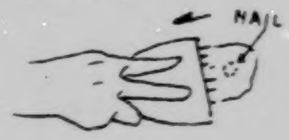


6. Apply a second coat of cement and smooth with the putty knife.



7. After the cement is completely dry, sand smooth and level.
8. Apply a third coat and sand smooth if necessary.
9. Apply a dab of cement to each nail head and level smooth with the putty knife.

NOTE: All nail heads should be slightly below the surface of the wallboard. This is done by dimpling with a hammer.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
10. Repeat with a second application and sand if necessary.	

METHOD OF EVALUATION:

Check for joints fully covered, concealed tape and feathered edges. Nail heads fully covered, smoothed. All lightly sanded.

JOB: Install Solid Wood Paneling

UNIT IX: Interior Finish

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-9

MATERIAL:
6d Finish Nails
1 X 6 Baseboard
1 X 2 Furring
Medium and Fine Sandpaper
Supply of 1 X 4, 1 X 6, and 1 X 8 T & G - V Joint Wood Paneling

EQUIPMENT:
Stepladder
Trestles

TOOLS:
11 Point Handsaw
Rule
Combination Square
Block Plane
Nailset
Hammer
Pencil
Level
Scribers
Jack Plane

SAFETY PRECAUTIONS:

1. Use safety when climbing ladder.
2. Observe safety when using hand tools/power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Install horizontal furring strips or 2" x 4" blocking every 16 inches on center, starting at the ceiling and working down to the floor.	NOTE: Lay out the 16" spacing at each corner and snap chalk lines across the studs from corner to corner.
2. Install baseboard around room if the board paneling is to set on top of a base.	
3. Arrange pieces of paneling on saw horses so they can be checked for appearance, defects and for arrangement of sizes if a random pattern is to be used.	NOTE: If random width paneling is used, sort out the sizes so they present an interesting appearance.
4. Measure distance from the top of the base to the ceiling, allowing 1/4" for clearance.	
5. Layout and cut paneling to length.	
6. Set first piece of paneling in place in the corner and check for plumb and make adjustments if necessary.	NOTE: Scribe to fit paneling at corners and to fit trim around openings, (or cut out to fit close to opening frames if casing is to be applied over paneling.
7. Fasten the paneling with 6d finish nails. Use face nails along the back edge and blind nailing at every furring strip along the tongue edge.	

COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

8. Set the next piece in place and drive it tight, using a scrap piece of paneling to strike with the hammer; then fasten with nails.

NOTE: Be sure to check the fit at the bottom of the paneling where it rests on the base. Make adjustments with a block plane if necessary.

9. Cut and fit paneling around door and window frames.

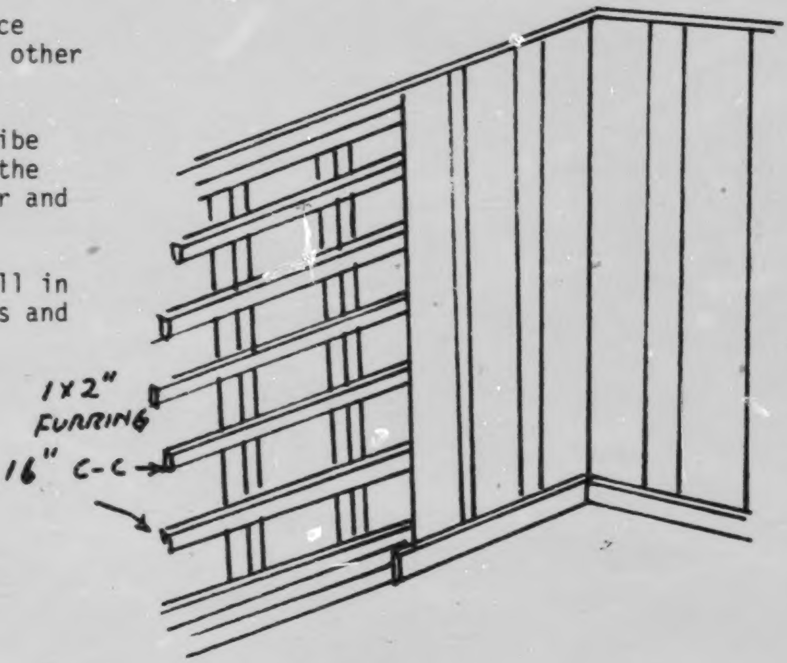
10. Continue to fit and install boards until the first wall is covered.

11. Start the second wall by setting the first piece in the corner and adjust it until it is plumb.

12. Scribe and fit this piece against the face of the other paneling.

13. Saw or plane to the scribe line and carefully fit the paneling into the corner and fasten in place.

14. After the paneling is all in place, sand all surfaces and set nails.



METHOD OF EVALUATION:

The work will be checked for size distribution, neatness and general appearance.

JOB: Apply Plywood or Composition Paneling

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-10

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL:
Sheets of 4' X 8' Plywood or Composition Paneling
Matching Nails or Adhesive

EQUIPMENT:
Stepladder
Extension Cord
Power Saw
Trestles

TOOLS:
11 Point Handsaw
Rule and Pencil
Level
Hammer
Square
Block Plane

SAFETY PRECAUTIONS:

All safety precautions necessary when doing interior finish.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check frame walls to be covered to make sure all nailers' backing and blocking is in place.	
2. Place several 2" x 4" x 8"'s on a pair of trestles on which to cut the paneling.	
3. Measure the wall height and mark the paneling 1/4" shorter. Cut the panel to length.	
4. Set the panel in place, starting in a corner and adjust it until it is plumb, then tack it.	
5. Determine amount to be scribed off of the edge next to the corner so opposite edge will move to the center of the stud.	
6. Scribe panel and cut to fit into corner.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
7. When panel is checked for fit and proper position, fasten in place with 3d finish nails. Drive nails into joints where possible.	NOTE: The joints in the paneling are usually placed at the 16" center, positioned so nails can be driven through the joints into the framing members.
8. Set all nails and fill holes with matching putty stick.	
9. When panels are to be fastened with adhesive or contact cement, fit the panel as before.	
10. Apply a ribbon of contact cement to the edge of the studs, and to all plates, nailers, etc.	
11. Tack the panel at the top.	NOTE: The paneling must be carefully placed in its exact position as the paneling and the studding come into contact.
12. Pull the bottom of the panel away from the studding about 10" to 12" and block temporarily.	
13. After about 10 minutes remove blocks and push the paneling against the studs.	
14. Nail through V-grooves at top and bottom.	
15. Continue to cut panels to length; fitting into corners, around openings, etc. and fastening in place with either nails or cement.	

METHOD OF EVALUATION:

Work will be checked for neatness and accuracy.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-11

JOB: Install Underlayment

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 4 X 8 Sheets of Hardboard or Plywood

EQUIPMENT: Sawhorses
Power Saw

TOOLS: Hand Tools

SAFETY PRECAUTIONS:

Observe general safety rules.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay a sheet of hardboard or plywood underlayment on the floor along one wall (preferably at right angles to the sub-floor).	
2. Continue to lay additional sheets of underlayment along the wall over the sub-floor, taking measurements and cutting sheets to length to fit around offsets, etc. Tack the corners of each sheet to keep them in place.	
3. Lay out and cut holes for pipes where necessary. Cut slots from behind the holes so they may slip over the pipes.	NOTE: A portion of the cut-out may be laid in behind the pipe after underlayment is installed.
4. Lay the second row of sheets of underlayment with joints staggered 1/4 or 1/2 sheet.	
5. When the entire floor has been covered, mark along each end wall with 4" spacings from side to side.	NOTE: When hardboard underlayment is used, nails are spaced 4" apart in rows every 4". When plywood is used, a 6" spacing is used instead of 4". Some underlayment is furnished with the nail locations pre-marked.
6. With a chalkline and chalk, snap lines from mark to mark.	
7. Lay out similar 4" marks along each side wall and snap chalk lines at right angle to those snapped in step #6.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Nail the underlayment with 3d fine cement coated nails. Place a nail at each 4" mark along all edges and seams and at each place where two chalk lines intersect.	NOTE: Make sure nails are driven into solid wood and not into cracks in the subfloor. Otherwise, nail popping may result.

METHOD OF EVALUATION:

Instructor will visually inspect the finished work.

JOB: Mark for a Hinge Gain

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 Pair, Butt Hinges, Loose Pin, 3 1/2 X 3 1/2
2 Pieces, 2 X 6 X 1' - 6"
Bench Vise

TOOLS: Butt Gage
Basic Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-12

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Mark position of hinge on edge of door. (Top of top hinge, bottom of bottom hinge) Fig. 1.

2. Indicate face of door.

3. Open the hinge and place the hinge on the edge of the door as shown with the barrel tight against the face of the door. Fig. 2.

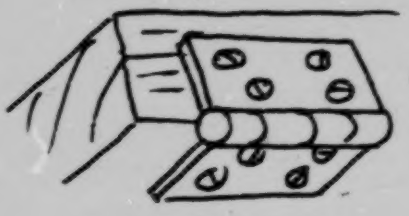


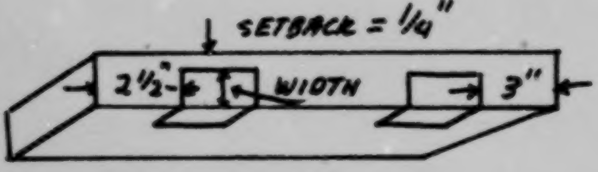
FIG 2

4. Align the end of the hinge with the mark made in step #1.

5. Hold hinge securely while marking along both ends of the hinge with a sharp knife.

NOTE: Do not mark completely across the edge of the door. Mark only the width of the gain.

6. Set one bar on the butt gage the width of the gain on the edge of the door between the end marks made in step #5.



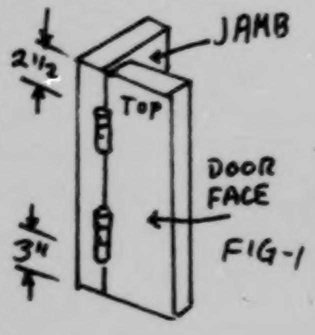


FIG-1

7. Set the bar with the single spur to the thickness of the hinge leaf.

8. Mark the depth of the mortise on the face of the door.

9. Mark for the other hinge gain in the same way.

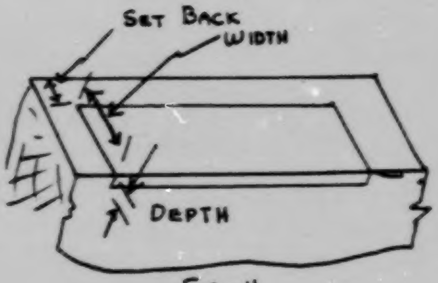


FIG. 4

NOTE: Finished layout should look like that in Fig. 4.

METHOD OF EVALUATION:

Check accuracy of layout.

JOB: Install Butt Hinges

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Use 2 X 6's From J-9-12
Butt Hinges From J-9-12

TOOLS: 1" Wood Chisel

SAFETY PRECAUTIONS:

Be careful when using edge cutting tools.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-13

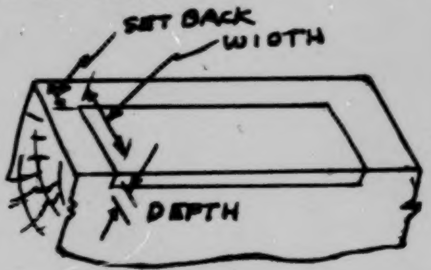
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Clamp the door in the vise.
2. With a sharp chisel,notch the two ends of the gain as shown at drawing B.
3. With the bevel side of the chisel down, notch the entire marking as shown in drawing C.
4. Clean the gain out by paring with the chisel.
5. Fit hinge in gain to see if it is properly cut out.
6. Place hinge in gain with loose pin pointing up.
7. Drill pilot holes for the screws.
8. Drive the first screw slightly toward the back of the hole to draw the leaf tightly into the gain.
9. Install the other screws.
10. Cut the other gain and install the second hinge.
11. Hold the door (2 X 6) in position next to the jamb and mark location of top and bottom of hinges on edge of jamb.

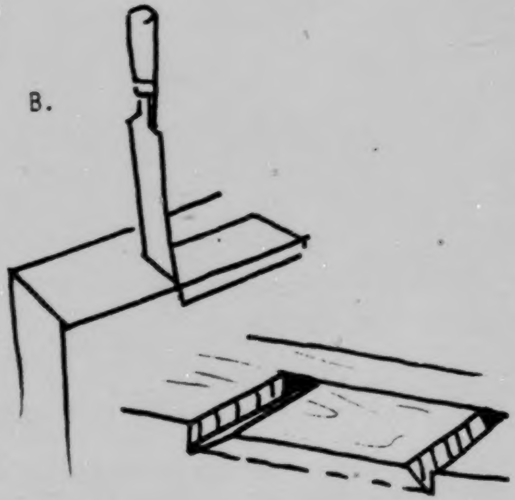
NOTE: When paring with a chisel the bevel side of the chisel is up.

NOTE: The hinge should be gained in perfectly flush with the door.

A.

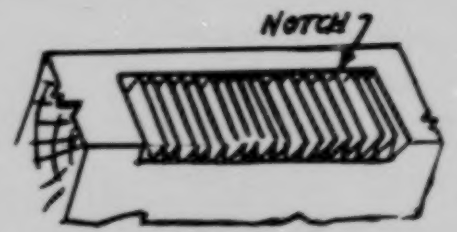


B.

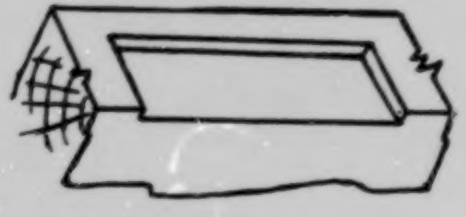


12. Remove the loose leaf of the hinge and use it to mark top and bottom cuts on face of jamb.
13. Use the butt gage to lay out width and depth of hinge gain on jamb.
14. Chisel mortise for hinges.
15. Attach loose leaf to jamb.
16. Hang door on hinges.
17. Adjust for fit if necessary.

C.



D.



METHOD OF EVALUATION:

Check installation for:
1. Hinge fits neatly in gain.
2. Hinge set to proper depth.
3. Screws driven properly.
4. Hinges at correct location.
5. Procedure.

JOB: Install A Lockset

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 2 X 6's From J-9-13
Lockset

EQUIPMENT: Drill

TOOLS: Basic Tool Kit
Wood Chisel

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-14

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

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1. Study instruction sheet furnished with lockset.
2. Measure 7" from bottom of door and square a line across edge of door.
3. Use template to mark for holes to be drilled.
4. Drill hole in side of door.
5. Drill hole in edge of door.
6. Insert latch bolt and mark around latch plate.
7. Chisel mortise for latch bolt.
8. Install latch bolt.
9. Assemble cylinder, rose plate and knob.

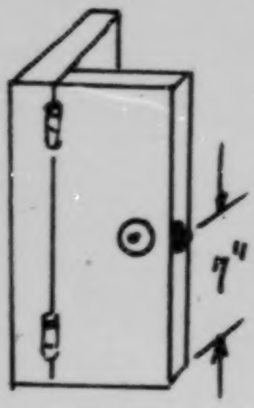


Fig-1

Practice laying out and cutting mortise for strike plate:

1. Square a line on the jamb 7" from bottom. (Fig. 2)
2. Center the cut-out in the strike plate with the line from step #1 to lay out for top and bottom of strike plate.

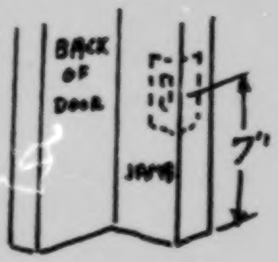


Fig 2

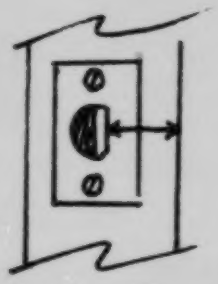


Fig 3

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
3. Gage a line on the face of the jamb back from the edge at a distance equal to the distance from the face of the door to the flat side of the latch bolt. (Fig. 3)	
4. Fasten strike plate (inside out) (upside down) to face of jamb between top and bottom marks with the cut-out aligned with the line gaged in step #3.	
5. Mark around strike plate with a sharp knife.	
6. Remove strike plate.	
7. Cut mortise for strike plate.	
8. Chisel out hole for latch bolt.	NOTE: Hole for latch bolt may also be drilled out prior to installing the strike plate.

METHOD OF EVALUATION:

Check for:
1. neat, accurate mortises.
2. accuracy of installation.
3. procedure.

JOB: Cut Gains for Hinges with a Router

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-15

UNIT IX: Interior Finish

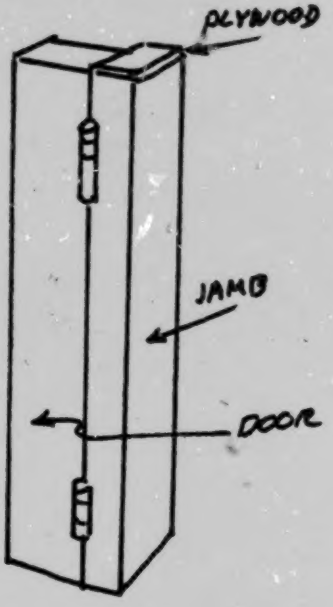
COURSE: Carpentry

MATERIAL: 2 Pieces, 2 X 6 X 6' - 8"
1 Piece Plywood, 1/2 X 3" X 5 1/2"

EQUIPMENT: Router
Door and Jamb Templet
Extension Cord
Bench Vise

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Make sure the templet is set properly and will not be able to move out of place. A small movement or improper alignment could result in damage to the door or jamb.

Using one piece of 2 X 6 to represent the door, nail the piece of plywood to the end of the other 2 X 6 and use it to represent the jamb.



1. Attach the templet guide for use with the hinge butt templet to the router base.
2. Install the bit specified for butt hinge routing.
3. Install the hinge butt templet to the edge of the door.
4. Adjust the motor in the base until the bit is just touching the edge of the door while the router is resting on a templet section.
5. From this point, lower the bit to make a cut equal to the thickness of the hinge leaf.
6. With the router in position on one of the templet sections so the bit is clear of the door, turn on motor.
7. Slide the router into the door along the right-hand guide pin for about 1/2".
8. Pull the router back from the door and take a light cut of about 1/4" along the edge of the door, working from right to left, until you reach the left-hand guide pin.

COMPETENCE - PROCEDURE/STEPS

9. Move the router into the door along the left-hand guide pin until you reach the back of the templet.
10. Move the router along the back of the templet until it rests against the right guide pin.
11. Draw the router in, passing over the first cut made.
12. Slide the router over the templet to remove all of the remaining stock.
13. Repeat this operation on the remaining templet sections.
14. Without disturbing the settings remove the complete templet assembly from the door and install it on the door jamb.
15. Proceed to rout the jamb in the same manner as for the door.
16. Install butt hinges on door and jamb.
17. Hang door on jamb.

TEACHING/LEARNING ACTIVITIES

NOTE: Follow Directions carefully. Allowance must be made for clearance at the top of the door.

NOTE: If square cornered hinges are being used, rounded corners must be squared up with a chisel.

METHOD OF EVALUATION:

The instructor will check the neatness and accuracy of the cut outs.

JOB: Assemble and Set an Interior Door Jamb

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 Set of Door Jambs, 2'-6" X 6'-8"
Cedar Shingles for Shims

EQUIPMENT: Straightedge

TOOLS: Basic Tool Kit

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-16

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check for size and swing of door.	NOTE: Height of finished door opening from finished floor to bottom of head jamb is usually 1/2" to 3/4" more than height of door.
2. Check floor for level.	
3. Mark and cut jamb sides so header will be level.	
4. Cut header to exact length.	NOTE: If the finished floor has not been installed temporary blocks equal to the thickness of the finished floor should be placed under the jambs.
5. Sand faces and edges of jambs.	
6. Nail side jambs to header	
7. Set jamb in opening.	NOTE: Make sure you can plumb the side jambs before you nail them at the top. Your rough opening may be out of plumb.
8. Check header for level.	
9. Using wood shingles, wedge the jamb at the header on both sides.	Use 8d finish nails. Be careful not to mar the jamb with hammer marks.
10. Nail the jamb to the trimmer stud at the top.	
11. Using a straightedge and a level, plumb the hinge side.	
12. Drive wedges in at the bottom until it is plumb.	
13. Nail the jamb to the trimmer stud at the bottom.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
14. Shim, straighten and nail the hinge side.	
15. Cut a spreader long enough to fit snugly between the side jambs at the head and place this strip between the two side jambs at the floor line.	
16. Wedge the second side jamb against the spreader and nail to the trimmer stud at the bottom.	
17. Shim and straighten the second side jamb.	
18. Straighten and nail the head jamb.	
19. Double check for plumb and straight.	
20. Set all nails and remove spreader.	
21. Cut off all wedges.	NOTE: Saw must be held in vertical position so as not to mar the finish wall or the jamb.

METHOD OF EVALUATION:

Check for:

1. height of opening.
2. width of opening.
3. plumb.
4. straight.
5. alignment with finish wall.
6. nailing.

JOB: Apply Casings to Door Frame

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 2Pieces casing, 3/4" x 2 1/4" x 7' - 0"
1Piece casing, 3/4" x 2 1/4" x 7' - 0"

TOOLS: Miter Box
Basic Tool Kit

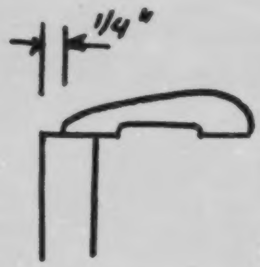
JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-17

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

1. Select casing stock and cut to rough length.
2. Sand casing stock.
3. Fit one side piece to the floor.
4. Mark and cut miter at the top.
5. Nail in place. (4d finish into jamb, 8d finish into wall)
6. Cut miter on head piece and fit to side piece.
7. Mark and cut miter on head piece on opposite end.
8. Fit second side piece to floor.
9. Mark and cut miter at the top.
10. Nail second side in place.
11. Fit the two mitered joints.
12. Nail all pieces in place.
13. Set all nails.
14. Remove all marks by sanding.



METHOD OF EVALUATION:

Check:
1. nailing
2. miter joints
3. margin
4. appearance

JOB: Fit A Door

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 Door Hollow Corr
2' - 6" X 6' - 8" Door Jamb from J-9-16

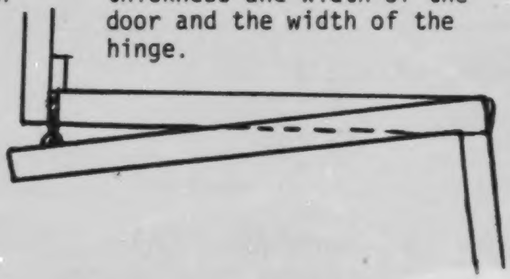
EQUIPMENT: Door Holder

TOOLS: Jack Plane or Jointer Plane
Basic Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-18

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check door jamb for straight and plumb. 2. Measure the size of the opening. 3. Check door size.	NOTE: If the door is longer than the height of the opening it will have to be laid on a pair of sawhorses and cut off.
4. Place the door in the opening with the hinge side against the jamb. 5. Plane and fit this edge to the jamb.	NOTE: If the door stops are not on the jamb, tack blocks to the jamb to prevent the door from going into the door opening beyond the thickness of the door.
6. Place the door in the opening and mark the lock side of the door along the jamb. 7. Plane the door to this line. 8. Place the door in the opening and check the fit. Insert a wedge at the bottom of the door and scribe the top of the door if it does not fit the head jamb. 9. Plane the top edge of the door to fit the top jamb.	NOTE: A well fitted door should fit the shape of the door opening and have a clearance 1/16" on each side and on top. There should be 1/2 to 3/4 of an inch at the bottom unless there is a threshold or carpet.
10. Bevel the lock edge of the door. 11. Remove the sharp edges of the door with the plane and sand all edges until they are smooth.	NOTE: The amount of bevel required will depend upon the thickness and width of the door and the width of the hinge.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
12. Indicate top, face side and hinge edge of door. (Very light pencil marks)	

METHOD OF EVALUATION:

Check for:

1. proper procedure
2. proper margin
3. proper bevel
4. hinge installation
5. lockset installation
6. stop installation

JOB: Hang a Door

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Door From J-9-18
Butt Hinges From J-9-12

TOOLS: Basic Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-19

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Install hinges on door.	
2. Set the door in the opening and wedge to proper position.	
3. Lay out the location of the hinges on the jamb.	
4. Attach hinges to jamb.	
5. Hang door on hinges.	
6. Adjust door for fit if necessary.	

METHOD OF EVALUATION:

Check:
1. hinge installation.
2. proper margin.
3. procedure.

JOB: Install Door Stops

UNIT IX: Interior Finish

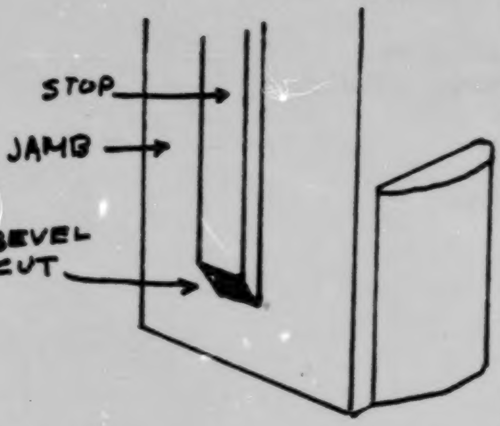
COURSE: Carpentry

MATERIAL: Door and Jamb From J-9-19

JOB SHEET
IDENTIFICATION CODE

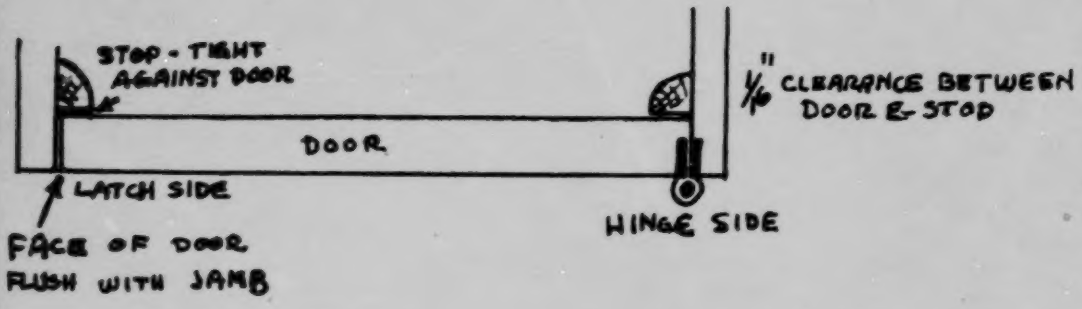
JOB NUMBER: J-9-20

TOOLS: Miter Box
Basic Tool Kit

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Measure the length of the side jambs and cut the stops to this length.	NOTE: Cut a 45° miter on the edge of the stop that fits the head jamb.
2. Measure the length of the head jamb and put a 45° miter cut on each end of the head stop.	NOTE: Stops may be cut 1" to 1 1/2" short of the floor to allow for easier cleaning.
3. Set the stop on the hinge side of the jamb allowing for a 1/16" clearance between it and the door. Tack in place.	
4. Set the stop on the lock side of the jamb so that when the door is closed it will be flush with the outside edge of the jamb.	
5. Set the top stop so it is in line with the side stops.	
6. Nail the stops securely with 4d finish nails.	
7. Sand.	

NOTE: A slight clearance (1/32") for a short distance above and below the strike plate will make the door easier to open and close.

NOTE: Door stops may also be coped at the interior corners. In this case the top would be installed first.


STOP - TIGHT AGAINST DOOR
1/16" CLEARANCE BETWEEN DOOR & STOP
DOOR
LATCH SIDE
HINGE SIDE
FACE OF DOOR FLUSH WITH JAMB

METHOD OF EVALUATION:

The instructor will check the neatness and accuracy of the finished job.

JOB: Fit and Hang a Door (Including Hardware)

JOB SHEET IDENTIFICATION CODE

UNIT IX: Interior Finish

JOB NUMBER: J-9-21

COURSE: Carpentry

MATERIAL:
1 Door
1 Pair Butt Hinges
1 Lock Set
1 Pair Door Stops

EQUIPMENT: Router and Hinge Template

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Be careful in the use of the router and sharp cutting edges.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Fit door to hinge side.
2. Fit and bevel door on lock side.
3. Fit door to head jamb.
4. Layout for hinges on door.
5. Cut in and fasten hinges on door.
6. Set door in opening.
7. Mark for hinge cut out in jamb.
8. Cut out for hinges in jamb.
9. Remove the pin and fasten the loose leaf to the jamb.
10. Hang door on hinges.
11. Check for good fit.
12. Mark door for lock set.
13. Install lockset in door.
14. Mark for strike plate in jamb.
15. Install strike plate in jamb.
16. Close door to check lockset for proper fit.
17. Install door stops.

COMPETENCE - PROCEDURE/STEPS TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

Check for:

1. Proper Procedure
2. Proper Margin
3. Proper Bevel
4. Hinge Installation
5. Lockset Installation
6. Stop Installation

JOB: Install Sliding Doors

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 2 doors, Sliding door hardware, Shims, Jamb set

TOOLS: Basic tool kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-22

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Read instructions with hardware.	NOTE: Check plans for size and type of doors.
2. Install track to head jamb.	
3. Install rollers on doors.	
4. Hang doors on track.	
5. Adjust rollers until doors are fit to jambs.	NOTE: Width of Door opening should be equal to width of two doors minus 1". This allows for the overlap in the center.
6. Install floor guides and finger pulls.	

METHOD OF EVALUATION:

1. Preparation
2. Layout and track installation
3. Door operation
4. Accuracy
   a. doors plumb
   b. fit
5. Appearance

JOB: Install Folding Doors

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Jamb Set Shims
Folding Door Unit

TOOLS: Basic Tool Kit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-23

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Read instructions with doors.	NOTE: Check plans for size and type of doors.
2. Install track to head jamb.	
3. Install floor plates.	
4. Install guides and rollers to doors.	
5. Set door units in place.	
6. Align doors.	
7. Install pulls.	

METHOD OF EVALUATION:

1. Preparation
2. Layout and track installation
3. Door operation
4. Accuracy
    a. doors plumb
    b. fit
5. Appearance

JOB: Install Window Stool and Apron

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-24

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Window Stool Stock
Casing Material for Apron

EQUIPMENT: Jointer

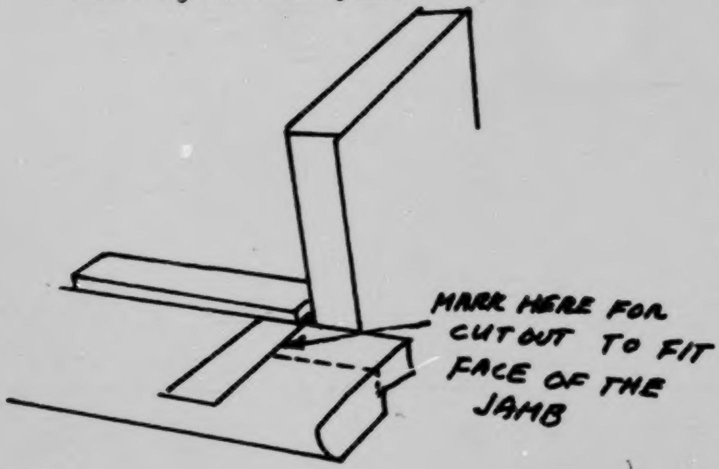
TOOLS: Standard Tool Kit

SAFETY PRECAUTIONS:

Be careful when using hand tools, power tools and machinery.

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Tack two strips on the window sill extending out far enough to support the window stool.
2. Place the window stool on top of the strips and place the square in position on the stool as shown and mark the location of the cut that will be made to fit the stool against the jamb.



3. Set a pair of scribers equal to the width of the rabbet on the window stool.
4. Hold the scribers against the wall to scribe a line on top of the stool from the side jamb to the ends of the stool.

TEACHING/LEARNING ACTIVITIES

NOTE: When making a finish cut on trim, always cut on the waste side of the cutting line, leaving part of the line; this will insure a snug fit.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
5. Carefully saw along these lines and remove the wood from the corners of the stool.	
6. Remove the two strips.	
7. Raise the lower sash and place the stool in its correct position and bring the sash down and mark a line on the stool along the edge of the sash; then plane to this line and fit the stool with 1/16" clearance between the stool and the sash.	
8. Cut the ends of the stool to reach beyond the jamb the width of the casing plus 1 inch. Sand the stool and nail in place.	NOTE: The ends of the stool should be cut to match the profile of the front edge.
9. Remove the rounded top edge and flatten the back side of the apron.	NOTE: The length of the apron is equal to the width of the jamb plus 1/2 inch to account for the 1/4" reveal on the jamb plus twice the width of the casing. In other words, the ends of the apron are in line with the outside edge of the casing.
10. Fit the apron under the stool.	
11. Cut to the proper length.	
12. Cut the ends of the apron to match the profile of the front edge.	
13. Nail the apron in position under the stool.	

METHOD OF EVALUATION:

The instructor will check:

1. Neatness and accuracy of the finished job.
2. End cuts on stool and apron
3. Miter joints
4. Nailing
5. Sanding

JOB:	Apply Window Casing	JOB SHEET IDENTIFICATION CODE
UNIT IX:	Interior Finish	
COURSE:	Carpentry	JOB NUMBER: J-9-25
MATERIAL:	3/4" X 2 1/4" Casing Stock	
EQUIPMENT:	Miter Box	
TOOLS:	Basic Tool Kit	

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut casing stock to rough length.	
2. Sand casings.	
3. Fit one side piece to the stool.	
4. Mark and cut miter at top end.	
5. Nail in place (4d finish into jamb, 8d finish into wall)	
6. Cut miter on head piece and fit to side.	
7. Mark and cut miter on other end of head casing.	
8. Fit second side piece to stool.	
9. Mark and cut miter at top.	
10. Nail second side in place.	
11. Fit the top to the sides.	
12. Nail all pieces in place.	
13. Fasten miters by nailing through top casing into the end of the side casings.	
14. Set all nails.	
15. Sand off all marks.	

METHOD OF EVALUATION:

Check:
1. Nailing
2. Miter Joints
3. Proper Margin
4. Overall Appearance

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-26

JOB: Trim a Window

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 Set of Window Stops
1 Stool
1 Set of Window Trim

EQUIPMENT: Miter Box

TOOLS: Basic Tool Kit

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place stool on strips and scribe for cutting.	
2. Mark and cut stool ends.	
3. Nail stool in place.	
4. Cut and apply casings to jamb.	
5. Cut and apply apron.	
6. Cut and apply stops.	

METHOD OF EVALUATION:

1. Layout
2. Check for accuracy
   a. fit
   b. plumb
   c. square

JOB: Determine Layout for Ceiling Tile

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-27

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: *1 X 3 Furring Strips*
8d Cement Coated Box Nails

TOOLS: Finishing Tools

SAFETY PRECAUTIONS:

Be careful while working overhead and standing on a ladder.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: Note the direction of the ceiling joists. The furring strips will be applied across the joists (at right angles).
1. If the joists run from side to side, measure each end of the room and find the center point.	NOTE: If the dimensions of the room are even feet and no inches, there will be a furring strip exactly in the center of the room. If there is an odd number of feet and no inches, the first furring strip will be placed 6" to one side of the center line.

2. Determine the dimensions of the border tile.

Example:

If the dimensions are feet and inches (19'- 7-1/2"); there will be 19 twelve-inch tile and 7-1/2" left over. Take one from the 19 to leave 18 full tile and add it to the 7-1/2"; thus,

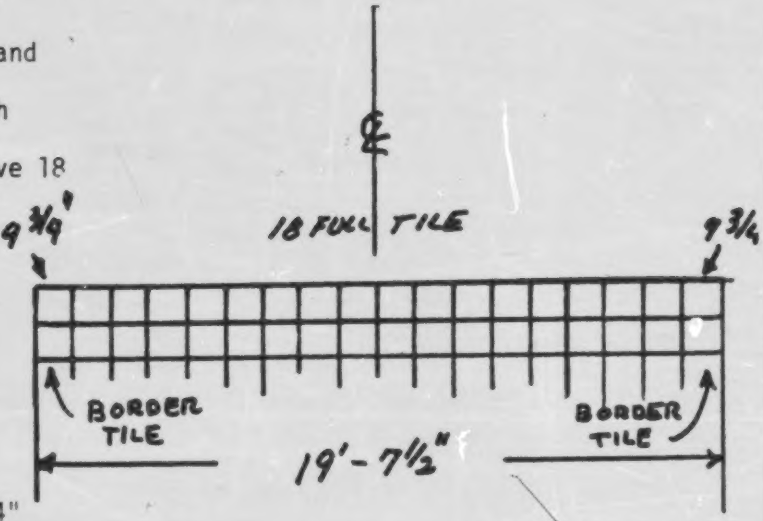
19-1 = 18 Tiles

```
   7 1/2"
 + 12
 --------
 = 19 1/2"
```

Then divide by two:

2⟌19 1/2 = 9 3/4"

The first tile will be 9-3/4" then 18 full tile and the last tile will be 9-3/4". These are the border tile.



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COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
	NOTE: Since there are 18 full tile in the main field there will be 9 on each side of the center line. Therefore, the first furring strip is placed in the center of the room. See sketch. NOTE: When there is an odd number of full tile in the main field (example 17), the first furring strip will be placed 6" to one side of the center line.

METHOD OF EVALUATION:

The instructor will check the accuracy of your measurements.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-28

JOB: Install Furring Strips for Ceiling Tile

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1" X 3" Furring Strips
8d Cement Coated Box Nails

EQUIPMENT: Saw Horses and Planks
Small Stepladder

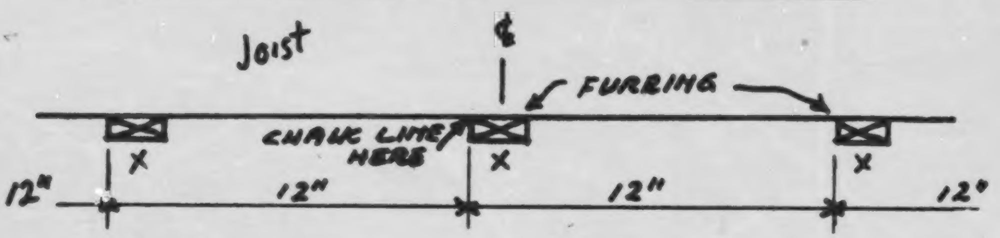
TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

General ladder and scaffold safety.

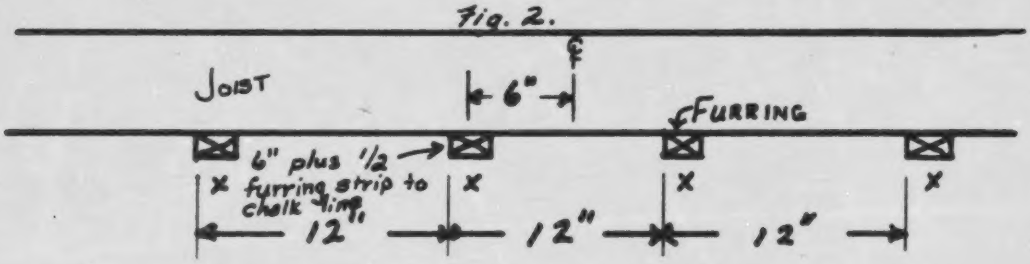
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: When there is an even number of full tile in the main field, (example 18) there will be an even number (9) on each side of the centerline. Therefore the first furring strip is placed in the center of the room. When there is an odd number of full tile in the main field, (example 17), the first furring strip will be placed 6" to one side of the center line. See Fig. 1 and 2 below.

Fig. 1.



℄
Joist
FURRING
CHALK LINE HERE
X
X
X
12"
12"
12"
12"

Fig. 2.



℄
Joist
6"
FURRING
6" plus 1/2 furring strip to chalk line
X
X
X
X
12"
12"
12"

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
1. If the first furring strip is to be located on the center line, measure to one side of this point, 1/2 the width of a furring strip. Do this at each end of the room and snap a chalk line through these points across the joist. All other furring strips will be located from this line.	NOTE: Chalk lines will locate the edge of the furring strips. Make sure the strips are placed on the proper side of the chalk line. It is always a good practice to mark an X on the side of the mark where the strips are to go.
2. Lay out 12" spacings to the right and left at both ends of the room.	NOTE: If there is an odd number of full tile in the main field, the first furring strip will be located with its center 6" to one side of the center line.
3. Snap chalk lines through these layout marks across the joists.	
4. Cut furring strips to length and fasten in place with two 8d nails into each joist. Make splices on the joist.	NOTE: To make a satisfactory job, the furring strips must be reasonably level (all in one plane). Strips that are high must be shimed down with shingles and those that are too low must be thinned on the back with a hatchet or plane. Check the furring with a straightedge in all directions. NOTE: A furring strip will also be required at each side along the wall.

METHOD OF EVALUATION:

Layout, alignment and leveling of furring strips.

JOB: Install Ceiling Tile

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 12" X 12" Tile - Continued from J-9-28

EQUIPMENT: Staple Tacker

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

Use care with staple gun. No horseplay.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-29

DRAWING NO: D-9-29

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Check to see if the furring strips have been placed accurately and that they have been securely fastened.
2. Measure the length of the room at or near the center furring strip. See D-9-29. Example: 18' - 5 1/2".
3. Add 12" (1 full tile), taken from 18, to the odd inches

   18 - 1 = 17 tiles

   5 1/2"
   + 12"
   17 1/2" ÷ 2 = 8 3/4"

   This is in the opposite direction of the joist.
4. From the center line, measure back along the center or near center furring strip 8'6" for 8 1/2 full tiles and place a mark. Move this mark forward 1/2" to locate the edge of the nailing lip of the first or border row of tile.

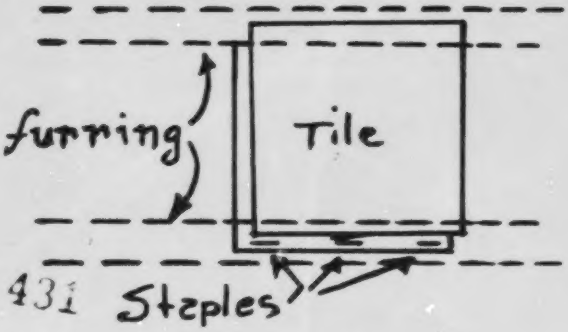
TEACHING/LEARNING ACTIVITIES

NOTE: When the ceiling joist have been located the number and size of border tile across the room have been determined it is now necessary to layout and determine the size of the border tile in the opposite direction. Step 2.

NOTE: The first or border tile will be 8 3/4" and there will be 17 full tiles in the main field plus an 8 3/4" border tile at the other end.

NOTE: With 17 full tiles in the main field, this means that the leading edge of the border tile will be 8 1/2 full tiles from the center line of the room.

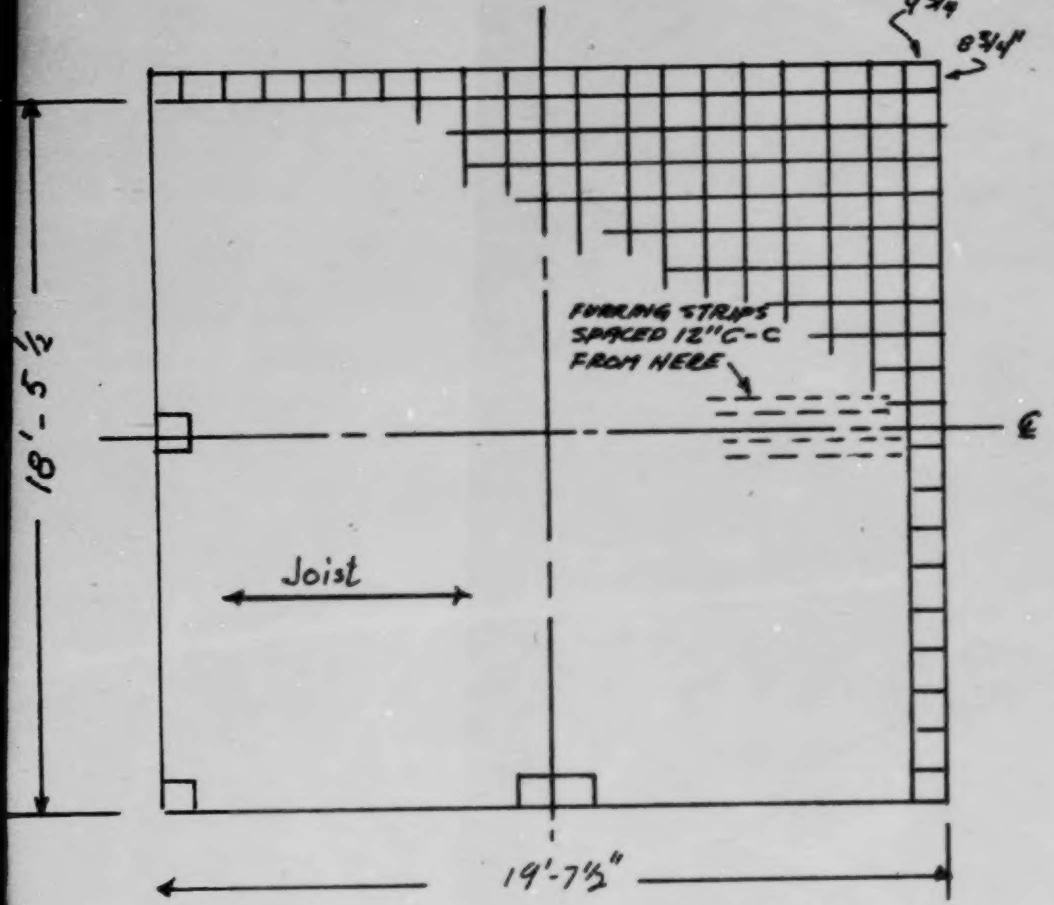
COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
5. Through this point and at right angles to the center line of the center furring strip, carefully snap a chalk line.	NOTE: Use the 3-4-5 method of laying out one line at right angles to another. Use this line just made as a guide when starting each row of tile.
6. Measure back from the center line of the center, or near center, furring strip to locate the leading edge of the first or border tile along the side of the room. Make this measurement at each end of the room and advance both marks 1/2" to locate the edge of the nailing lip. Snap chalkline through these points.	NOTE: You now have two chalklines to follow, one on the second furring strip along the side of the room marked A-B, and another across the furring strips to serve as a guide for the border tile at the end of the room.
7. Measure from chalk line to wall and deduct 1/4" for clearance and expansion and lay out this measurement on a piece of ceiling tile.	NOTE: Be sure to measure back from the lip edge.
8. Very carefully cut the tile along the layout lines so as not to mar or smudge the surface.	NOTE: It will be necessary to cut the corner tile to the size of both side and end border tiles.
9. When the corner tile and several border tile are cut, hold corner tile in place so that the lip or nailing flange aligns with both chalk lines and fasten in place.	NOTE: When fastening with staples, place the staples as shown in the sketch.
10. Place the next border tile in position and exert pressure so that tongue and groove joints engage. The joint should be tight but not enough to push the first tile out of line. Make sure that the corners of the tiles line up exactly and that the lip edge follows the chalk line. Staple in place.	NOTE: The edges of the tiles close to the walls may be nailed with 3d box nails. The molding will cover these nails.



COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
11. Continue to cut and install the remaining border tile and the second corner tile until the first row is complete.	NOTE: It is important to have this first border row of tile straight.
12. Cut the border tile at the beginning of the second row and fasten in place.	NOTE: The remainder of the second row will be whole tile.
13. Place the tile and apply pressure to engage the tongue and groove joints. Do not overpush the tile. Make sure all corners line up.	NOTE: A slight tap with a clean block of wood and a hammer may sometimes help to bring the joints tight. If the tile is driven too far, wiggle the tile loose and try again. Making sure that all corners line up exactly cannot be overemphasized.
14. Continue to place and fasten whole tile as described, and cut and install border tile as you go. Make sure that the first border tile in each row is held to the chalk line.	NOTE: If the tile are to be fastened with ceiling tile cement, the same procedure is used to lay out and cut the tile. The tiles are then laid upside down on a clean surface. A gob of cement the size of a walnut is placed 2" in from each corner (none in the middle). The tile is pressed against the ceiling about 2" away from its final position. The tile is then slid or shifted into place so the tongue and groove joints engage, and corners exactly line up as described before.
15. When cutting the last corner tile, allow a quarter inch clearance on both sides so the tile can be placed against the ceiling and then slid into the tongue and groove joints.	

METHOD OF EVALUATION:

The work will be checked for accuracy and neatness and above all, for smudges and damaged edges and surfaces.


9 3/4
8 3/4"
FURRING STRIPS
SPACED 12" C-C
FROM HERE
℄
18'-5 1/2
Joist
19'-7 1/2"

CEILING TILE LAYOUT

DRAWING NUMBER

D-9-29

JOB: Install Ceiling Moldings

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Crown Molding

EQUIPMENT: Miter Box

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Observe ladder safety

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-30

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut molding to rough lengths.	NOTE: Crown moldings must be placed in the miter box up side down for proper cutting to make a cope fit.
2. Plan sequence of application.	
3. Measure the exact length of one wall, cut first piece and nail in place.	
4. Make a cope cut on one end of second piece measure exact length and make straight cut on other end.	
5. Check for fit and nail in place.	
6. Take third piece and repeat steps 4 & 5.	
7. Take fourth piece and cut cope joint on one end, measure exact length between moldings.	
8. Mark and cut cope joint on other end, spring into place and finish nailing.	

METHOD OF EVALUATION:

1. Preparation
2. Layout
3. Accuracy and fit
4. Appearance

JOB: Lay Out and Install Ceiling Tile on Furring

JOB SHEET IDENTIFICATION CODE

UNIT IX: Interior Finish

JOB NUMBER: J-9-31

COURSE: Carpentry

MATERIAL:
1" X 3" W/P Furring Strips
Cartons of 12" X 12" X 1/2" Insulation Ceiling Tile
8d Cement Coated Box Nails
Wallboard Cement
9/16" Staples
2" Crown Molding

EQUIPMENT: Trestles and Plank for Scaffold

TOOLS:
Basic Hand Tools
Staple Gun

SAFETY PRECAUTIONS:

1. General safety precautions while working on scaffolds.
2. Care in using hand tools, especially the utility knife.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out a center line across the ceiling joist.	. SC-9-11
2. Determine exact location of furring strips and lay out the spacings along the joist at each side of the room.	NOTE: If tile are to be installed other than on furring strips, omit steps 2, 3, 4 and 5.
3. Cut furring strips to length and fasten them to the joist along the chalklines using 8d nails.	
4. Nail furring strips along each side wall.	
5. Cut and fasten blocks in between furring strips at each end of the room.	
6. Lay out on furring strips for first row of border tile and snap a chalk line as a guideline for these tile.	NOTE: Also snap a chalkline at right angle as a guideline to keep tile square.
7. Cut first (corner) tile and fasten in place.	
8. Cut and fasten the remaining border tile along one side, including the corner tile at the other end.	

COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

9. Cut and install the border tile at the beginning of the second row.

10. Carefully place and fasten the tiles in the second row.

11. Cut and fasten the last or border tile at the other end of the second row.

12. Continue to cut and fasten the border tiles in place and fill in with the whole tiles in each row, until the ceiling is covered and the last two corner tiles and the border tiles are installed.

13. Fit and install ceiling molding.

METHOD OF EVALUATION:

1. Ceiling preparation
2. Layout
3. Fastening practices
4. Ceiling appearance

JOB: Lay Out and Install Main Runners For Suspended Ceiling

JOB SHEET IDENTIFICATION CODE

UNIT IX: Interior Finish

JOB NUMBER: J-9-32

COURSE: Carpentry

MATERIAL:
- Wall Angle
- Main Runners
- Saw Horses
- Nails
- Screweyes
- Suspension Wire

TOOLS:
- Hack Saw
- Pliers

SAFETY PRECAUTIONS:

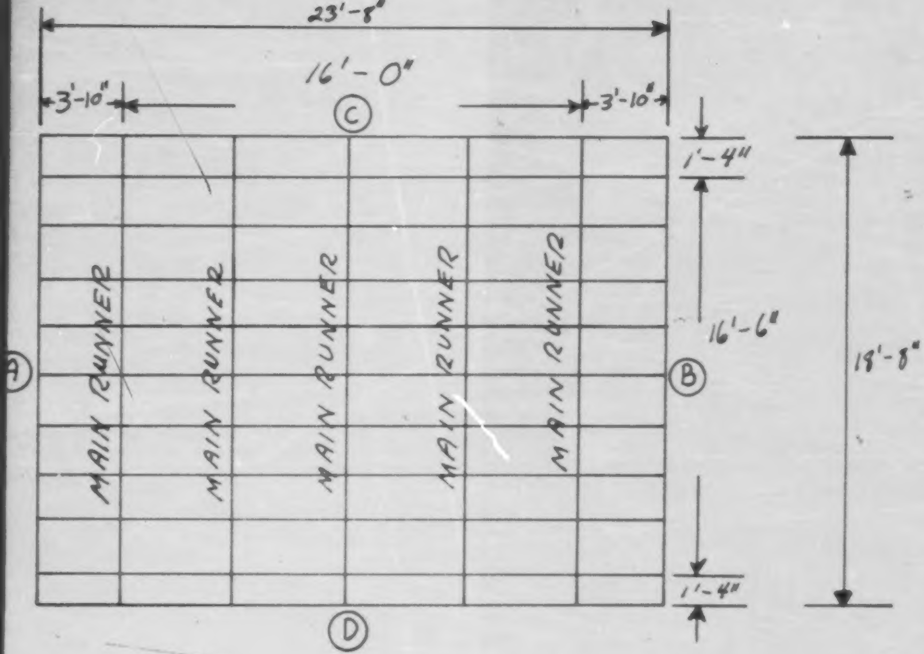
Use care when cutting thin metal with a hacksaw and with pliers and wire.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Install the wall angle around the perimeter of the room at the required height.	NOTE: Maintain a minimum of 3 to 4 inches between joist and suspended ceiling to allow room to lay panels into grid system.
2. Make a layout of the room to determine the number of full panels and the size of the border panels along both the sides and ends. See D-9-32.	NOTE: Panels are generally placed with the 4' dimension running the longest dimension of the room. Thus the main runners are generally run across the room.
3. Stretch a reference line from end to end just below the wall angle along center line A-B, D-9-32.	NOTE: The center line across the room must be established perpendicular to the main center line running longways with the room.
4. At the middle of this center line, establish a reference line C-D perpendicular to A-B. Attach just below the wall angle. This line will be used as a guide line for the first main runner.	NOTE: In the example a main runner will be placed across the room along the center line. Likewise there will be a row of cross-T's along the center line.
5. Measure along center line C-D from the center to the outer wall, and lay this distance on a main runner. The measurement (9'-2" in example) should be taken from a cross-T slot that will produce the least amount of waste.	NOTE: Make sure when the main runner is in place that a cross-T slot falls exactly over the main reference line A-B.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
6. Use a fine tooth hack saw and cut off the main runner at this point.	
7. Place screweyes into the joist above reference line C-D at 4' intervals.	
8. Attach suspension wires to the screweyes allowing several inches below the wall angle level.	
9. Place the cut end of the main runner on the wall angle and hold the just above the reference line.	
10. Attach the wires to the runner in the holes provided.	NOTE: Do not attach wires too securely until all wires are in place and runners are aligned and checked.
11. Take a measurement and cut another section of main runner to length.	
12. Connect first and second runners together and rest the other end on the wall angle.	
13. Attach wires to suspend runner.	
14. Lay out 4' spacing for remaining main runners.	
15. Move reference line and install next row of main runners.	
16. Continue to use reference line and install remaining main runners.	

METHOD OF EVALUATION:

1. Runners are in proper alignment.
2. Runners are level.


23'-8"
16'-0"
3'-10"
3'-10"
C
D
A
B
MAIN RUNNER
MAIN RUNNER
MAIN RUNNER
MAIN RUNNER
MAIN RUNNER
1'-4"
16'-6"
1'-4"
18'-8"

LAY OUT OF MAIN RUNNERS

433

DRAWING NUMBER

D-9-32

JOB: Install Cross T's

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Quantity of 4' Cross T's

EQUIPMENT: Ladder
Sawhorses

TOOLS: Hacksaw

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-33

SAFETY PRECAUTIONS:

Use care when cutting thin metal with the hacksaw, be aware of sharp edges.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check ceiling layout plan to determine number of cross-T's required.	
2. Starting at the center of the room, install the 4' long cross-T's into the proper slots in the main runners.	
3. Sight along this row of cross-T's to see if they are straight.	NOTE: If the main runners have been installed properly the cross-T's will be in a straight line.
4. Install remaining cross-T's in rows two feet apart until all full length T's are in place. Check again for alignment.	NOTE: Check the runners and T's frequently to make sure they are in straight lines.
5. After all the full length T's are in place, cut the remaining T's to length along the walls allowing them to rest on the wall angle.	
6. After the grid system is complete, check the main runners and cross T's for alignment and level.	

METHOD OF EVALUATION:

The grid system will be checked for alignment of rows and for level.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-34

JOB: Install Ceiling Panels

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 2' X 4' Suspended Ceiling Panels

EQUIPMENT: Sawhorses

TOOLS: Hand Saw

SAFETY PRECAUTIONS:

Use care in handling finished materials to prevent damage or smudging.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Ceiling panel cartons should be opened up prior to installation so they can adjust to room atmosphere.	
2. Lay all full size panels in place.	
3. Cut and fit border panels along side walls.	NOTE: Allow clearance for expansion.
4. Lay panels in place.	
5. Cut end wall panels to length and drop in place.	NOTE: Corner panels will be cut to both length and width.
6. Cut corner panels to width and length and set in place.	

METHOD OF EVALUATION:

1. Check main panels for alignment.
2. Check border panels for fit and clearance.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-35

JOB: Install Suspended Ceiling

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL:
Main Runners
Cross Tees
Ceiling Panels
Wall Angle
Screw Eyes
Suspension Wire

EQUIPMENT: Trestles and Planks Per Scaffold

TOOLS:
Hacksaw
Hammer
Line Level
Pliers
Rule
Chalkline
Wire Cutters
Pencil

SAFETY PRECAUTIONS:

1. General safety precautions while working on scaffolds.
2. Care in using hand tools.
3. Be careful of sharp ends of uncoiled wire around face and eyes.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Determine height of ceiling and with a chalkline, mark a level line around the room at this height.	
2. Cut and install the wall angle along this line.	NOTE: Example: Ceiling to be 17'-8" wide by 31'-0".
3. Make a plan of the ceiling to determine the number of whole ceiling panels and the size of the border panels both sides and both ends.	NOTE: The ceiling is generally laid out so panels are lengthwise with the longest dimension of the room.
4. Install screw eyes into the joists directly above the main runners every 4 feet.	
5. Cut main runners to length and suspend on wires from screw eyes.	
6. Insert all full length cross tees in proper slots in main runners.	
7. Cut and install cross tees for border panels at each end of the ceiling.	

COMPETENCE - PROCEDURES/STEPS | TEACHING/LEARNING ACTIVITIES

8. Lay all full sized panels in place.

9. Cut border panels to size and lay in place to complete the ceiling.

METHOD OF EVALUATION:

1. Preparation
2. Layout
3. Installation practices
4. Appearance

JOB: Install Resilient Floor Tile

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Floor Tile Adhesive

EQUIPMENT: Notched Trowel or Brush

TOOLS: Chalkline, Framing Square, Folding Rule or Tape, Knife or Tile Cutter

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-36

SAFETY PRECAUTIONS:

Care in using hand tools, especially knife.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check the subfloor and/or underlayment to make sure that it is smooth and clean and that joints are even.	NOTE: Joint filler is sometimes required to fill cracks and to level up uneven areas, so that imperfections in the underlayment are not "telegraphed" to the surface of the resilient floor tile. It may be necessary to also cement a layer of underlayment felt to make a satisfactory surface to lay the tile on.
2. Find the center point at each end of the room and establish a main center line with a chalk line snapped between the center points at the end walls.	
3. At the middle of this main center line, lay out a second center line perpendicular to the first.	NOTE: Use the 3-4-5 method to lay out the second center line at right angles to the first one.
4. From the center of the room, lay a row of tile along the main center line to the wall. Lay as many full tile as can be laid (dry run -- no cement) without cutting.	
5. Measure the distance from the last whole tile to the wall.	NOTE: If the distance from the last whole tile to the wall is less than 1/2 tile (4-1/2" for 9" X 9" tile), shift the secondary center line 1/2 tile (4-1/2") to one side (either right or left). If the above distance is 4-1/2" or more, the center line will remain where it is.
6. Repeat the above procedure along the secondary center line and shift the main center line if necessary.	
7. When the main and secondary center lines have been established, read the manufacturer's directions that accompany the floor tile, as well as the label on the tile adhesive container.	

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
8. Spread the adhesive over one quarter of the floor area, working close to the center lines, but not covering them up.	NOTE: Use the proper size notched trowel called for in the instructions. NOTE: Allow the adhesive to dry 15 minutes, or more, until tacky when pressed with the thumb. The adhesive should not stick to the thumb.
9. Place tile beginning at the center of the room.along the chalk line making sure that the corners of the tiles line up exactly with each other.	
10. Lay the tile in place.	NOTE: Do not slide tile, as adhesive may be pushed ahead and get between the edges of the tile. This pushed adhesive will prevent a tight joint and will cause adhesive to ooze up between the tiles.
11. When all of the whole tiles are in place, cut to size and set in place the border tiles.	NOTE: To cut a border tile, place a full tile exactly over the last full tile next to the wall. Next lay another full tile against the wall and overlapping this tile. With a sharp pencil or knife, mark along the edge of the top tile where it overlaps the next tile below. Cut along this line with a pair of tin snips. This tile should then fit into the space along the the border.
12. Repeat the above procedure until all border tiles are in place.	
13. When the first quarter is complete, spread adhesive over another quarter and repeat the above procedure until the entire floor is covered.	
14. After all of the tiles are laid and all border tiles cut and in place, fit and install the cove base.	
15. Cut the pieces of base and set them in place to check for fit.	
16. After each piece is cut and fit, give it a coat of special adhesive and press in place.	
17. If required by manufacturer's recommendations, roll the entire floor with a suitable floor roller.	

COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
18. Clean off all traces of adhesive from the floor.	

METHOD OF EVALUATION:

1. Preparation
2. Layout
3. Adhesive spread correctly
4. Tile fit
5. Clean up

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-37

JOB:	Lay Hardwood Flooring	
UNIT IX:	Interior Finish	
COURSE:	Carpentry	
MATERIAL:	8d Cut Flooring Nails 25/32" x 2 1/4" End Matched Flooring 8d Spiral Shank Nails Nails for Nailing Machine	
EQUIPMENT:	Floor Nailing Machine	
TOOLS:	Hammer Rule Chalkline	10 Point Handsaw Pencil Utility Knife

SAFETY PRECAUTIONS:

1. Beware of hardened nails - may break and fly, causing an injury to someone.
2. Be careful not to pound fingers.
3. Beware of the utility knife.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check subfloor to make certain it is properly nailed and leveled.	
2. Install underlayment (preferably 15 lb. saturated felt).	
3. Determine the most appropriate starting point.	NOTE: The starting point may be the long side of a main room or down one side of a long hallway where the flooring can be laid ahead into several rooms and reversed and laid back into other rooms. It is generally agreed that the finish floor should be laid at right angles to the floor joists, if at all possible. It is also considered best practice to lay finish flooring parallel to the longest dimension in principle rooms such as living rooms.
4. Measure 6" out from the wall at each end of the room or hall, and snap a chalkline.	
5. Select long straight lengths of flooring and lay them down along the floor near the wall until a complete row of flooring is cut and laid out along the wall.	
6. Drill holes for face nailing near the back or groove edge of the flooring.	
7. Begin at one end of the first row of flooring and place the strip 1/2" away from the wall and fasten with a finish nail in the hole drilled for face nailing.	

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
8. Place a rule against the tongue edge of the strip at the point just fastened, and measure the distance to the chalkline.	NOTE: Use this distance to set the remainder of the row of flooring parallel to the chalk line.
9. Face nail the flooring as you go.	
10. Pre-drill into the tongue edge of this row and blind nail this edge of the flooring.	
11. Lay out and carefully arrange enough flooring to lay several feet at a time.	NOTE: Joints should be well distributed and no joint should be closer than 6" to another joint unless separated by one or two strips of flooring. Short lengths of flooring should be well mixed with the longer lengths.
12. Draw the flooring up so all joints are tight. Use a scrap block of flooring to strike against when driving the pieces together.	
13. As the strips are driven tight, blind nail them every 10" until all the flooring is fastened in place.	
14. Continue the above procedure until the opposite wall is reached.	NOTE: A minimum of waste will result if, as pieces of flooring are cut at the ends of the row, the ends remaining are carried back to be worked in at the beginning of the next row.
15. Where necessary, prepare a slip tongue or spline to fit into the groove edge of the first strip of flooring if it passes an opening into a closet or another room.	NOTE: The last several rows of flooring will have to be pried back into place and drilled and face nailed. Care should be taken to avoid damage to walls if they are used to pry against.
16. Reverse the flooring and lay in the opposite direction into these rooms.	
17. Fit and install base shoe.	
18. Sweep floor clean and cover traffic areas.	

METHOD OF EVALUATION:

1. Subfloor preparation
2. Start at correct point
3. Floor layout
4. Nailing practices
5. Board fit

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-38

JOB:	Install Base Trim	
UNIT IX:	Interior Finish	
COURSE:	Carpentry	
MATERIAL:	Baseboard Shoe Molding	8d Finish Nails 4d Finish Nails
EQUIPMENT:	Miter Box	
TOOLS:	Basic Tool Kit	

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Cut baseboard to rough lengths. 2. Plan sequence of application.	NOTE: Rough lengths should be approximately 2" longer than exact length needed.
3. Locate all wall studs and mark on the floor. 4. Cut a piece of baseboard for the longest wall and nail in place with 8d finishing nails.	NOTE: If two pieces of baseboard are required, the splice should be made on a stud and ends should be mitered.
5. Cope the end of a second piece of molding for an adjacent wall; check fit and then square cut to exact length.	
6. Nail the second piece in place.	
7. Continue fitting pieces of baseboard in place around the room.	
8. Use above procedure to fit and install base shoe.	

METHOD OF EVALUATION:

1. Preparation
2. Layout
3. Accuracy and fit
4. Appearance

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-39

JOB: Install Closet Trim and Shelving

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 x 4 For Shelf Rail
1 x 12 For Shelf
Closet Rod
Baseboard Shoe Molding

EQUIPMENT: Miter Box

TOOLS: Basic Tool Kit

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check detail on closet interior.	
2. Cut and install casings.	
3. Cut and install baseboard.	
4. Cut and install shoe molding	
5. Cut and install shelf rail.	
6. Cut and install shelf.	
7. Install closet rod.	

METHOD OF EVALUATION:

1. Preparation
2. Layout
3. Accuracy and fit
4. Appearance

JOB: Install a Threshold (Aluminum)

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-40

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 Aluminum Threshold 3' long

EQUIPMENT: Sawhorses

TOOLS: Hacksaw

SAFETY PRECAUTIONS:

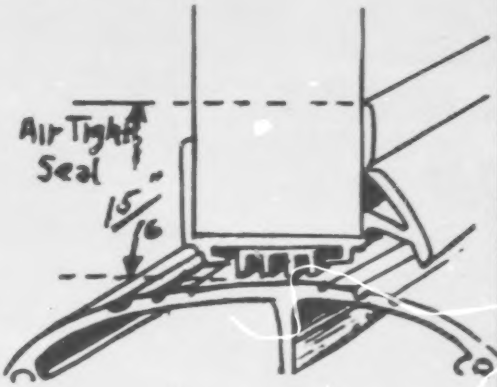
Use hacksaw carefully.

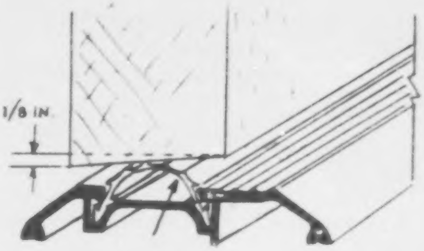
COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Remove the threshold from the package.
2. Read instruction sheet sent with it.
3. Measure the required distance from the floor and put a mark on each side of the door.
4. Take a straight edge and draw a line connecting these two marks.
5. Remove door from hinges and lay on a pair of saw horses.
6. Use a sharp knife and cut on the pencil line, this will keep the door from splintering when sawing.
7. Set the electric hand saw to the proper bevel and cut the door.
8. Straighten with a plane and sand smooth.
9. Lay the threshold at the door opening and mark for cut outs so it will fit in its proper place.
10. Cut with the hack saw.
11. Insert into place and fasten down.
12. Hang door back on hinges and check for proper fit.

TEACHING/LEARNING ACTIVITIES

NOTE: Most thresholds used today are made from aluminum extrusions. A special vinyl strip is inserted into the threshold.





METHOD OF EVALUATION:

The instructor will check neatness and accuracy of the finished job.

JOB: Make a Mortice and Tennon Joint

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 2 pieces, 3/4" X 1 3/4" X 4"

EQUIPMENT: Bench Vise

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

Use care when working with sharp edge cutting tools.

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-41

DRAWING NO.: D-9-41

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out mortice as in Fig. 1.	NOTE: The mortice and tennon joint is used in making sashes and doors and in cabinet work.
2. On the center line, measure and mark a distance of 1/8" from each end. Lay off 1/4" spaces between these marks. These marks locate the centers for drilling out the mortice.	NOTE: Marking gage may be used on the layout for greater accuracy.
3. Place 1/4" (#4) auger bit in brace and set depth gage to 1 3/8".	NOTE: Be sure to hold auger bit square with work.
4. Bore 5 holes 1 3/8" deep, boring the two outside holes first.	
5. Square out the ends and sides of the mortice with a wood chisel.	
6. Lay out tennon as in Fig. 2.	NOTE: Lay out all four sides and the end tennon will be 1/4" X 1 1/4" X 1 1/4".
7. Use back saw to cut around shoulders to a depth of 1/4".	
8. Saw sides and ends of tennon, cutting on waste side of mark.	
9. Make trial assembly and trim tennon to fit using a sharp chisel.	

METHOD OF EVALUATION:

1. Check for accuracy of dimensions.
2. Check for snug fit.

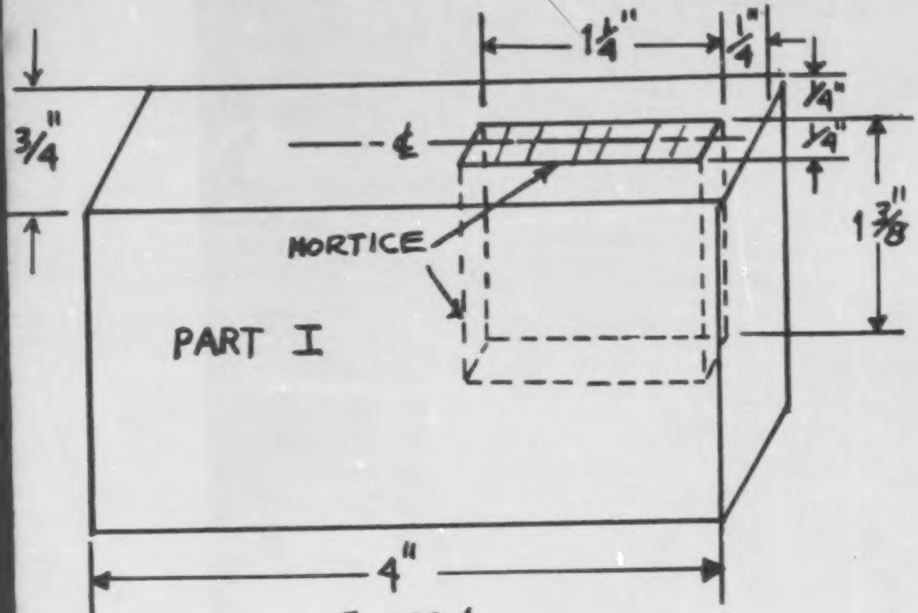

3/4"
1 1/4"
1/4"
1/4"
1/4"
℄
MORTICE
1 3/8"
PART I
4"

FIGURE 1

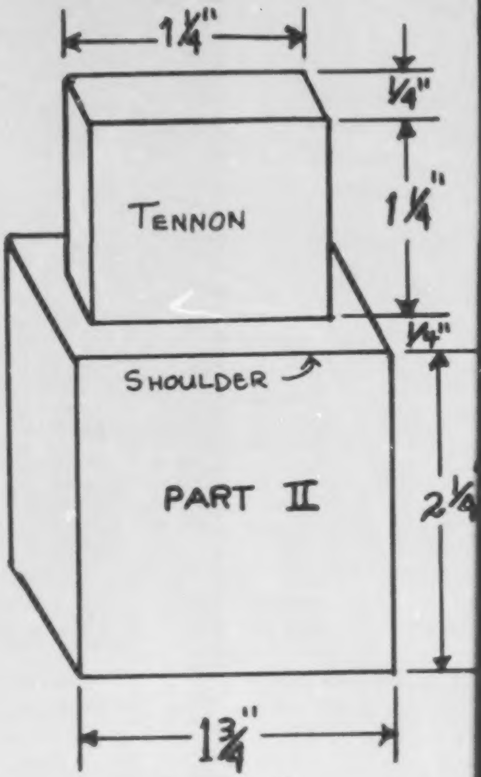
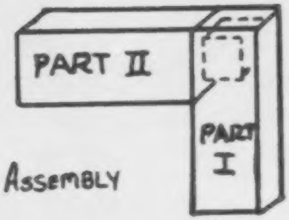

1 1/4"
1/4"
TENNON
1 1/4"
1/4"
SHOULDER
PART II
2 1/4
1 3/4"

FIGURE 2


PART II
PART I

Assembly

MORTICE & TENNON JOINTS

D-9-41

JOB: Make A Cross Lap Joint

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 2 pieces, 3/4" X 1 3/4" X 4"

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-42

DRAWING NO.: D-9-42

TOOLS: Basic Hand Tools

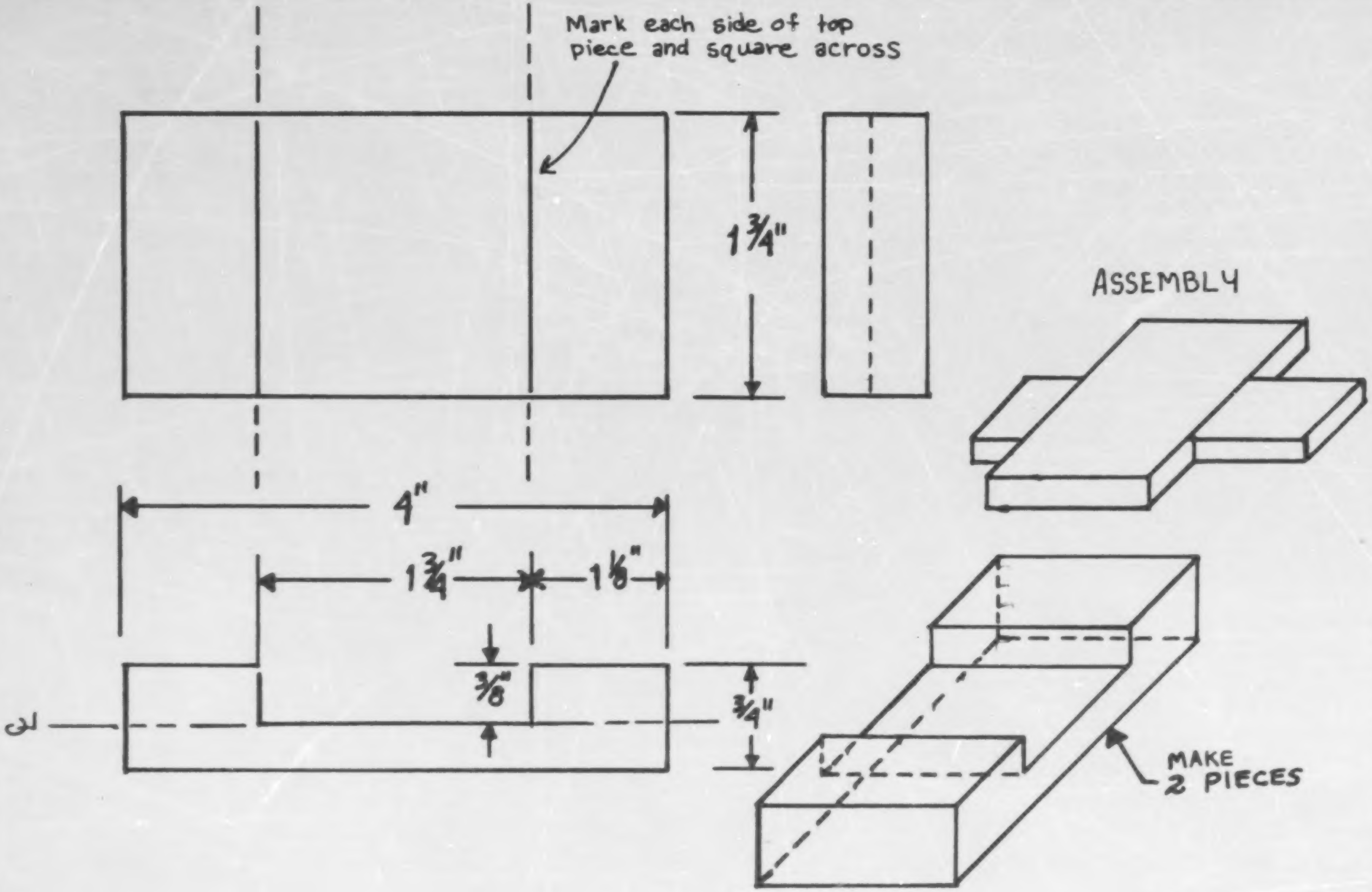
SAFETY PRECAUTIONS:

Observe hand tool safety.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out each piece as in attached drawing.	NOTE: For greater accuracy place one piece on top of the other to mark width of cutout or to check on layout.
2. Square down sides of cut and gage depth of cut. Make sure gage line is exactly centered.	NOTE: To make sure gage line is exactly in the center hold the marking gage against both sides of stock and adjust marking gage until the marking pin is centered.
3. Saw down sides of cutout with back saw, cutting on waste side of line.	
4. Prepare both pieces exactly alike.	
5. Make trial assembly.	
6. Trim sides and pare bottom of notches as required to bring both pieces together flush.	

METHOD OF EVALUATION:

Cneck work for neat snug fit and for accuracy.


Mark each side of top piece and square across
1 3/4"
ASSEMBLY
4"
1 3/4"
1 1/8"
3/8"
3/4"
CL
MAKE 2 PIECES

CROSS LAP JOINTS

DRAWING NUMBER:

D-9-42

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-43

JOB: Make a Reinforced Butt Joint

UNIT IX: Interior Finish

COURSE: Carpentry

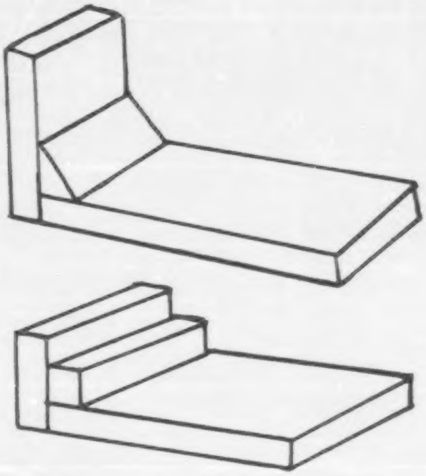
MATERIAL: Two short pieces of 1 X 4 stock

TOOLS: Basic Hand Tools

SAFETY PRECAUTIONS:

Along with safety, neatness and accuracy are important.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Take two pieces of wood and cut the ends true and square.	NOTE: A butt joint is a very common joint, but is very weak unless it is reinforced.
2. Apply glue to the end grain of one piece.	
3. Apply it to the other piece as shown and clamp in place.	
4. Cut a square or a triangular block and apply glue to the faces and press it into the corner firmly.	
5. Remove clamps when dry.	NOTE: Do not disturb until it is dry.



METHOD OF EVALUATION:

The instructor will check the neatness and accuracy of the finished joint.

JOB: Make a Lipped Cabinet Door

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: 1 piece 3/4" X 14" X 23" G2S Plywood

EQUIPMENT: Table or Radial Saw

TOOLS: Hand Tools for Finish Work

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-44

DRAWING NO.: D-9-44

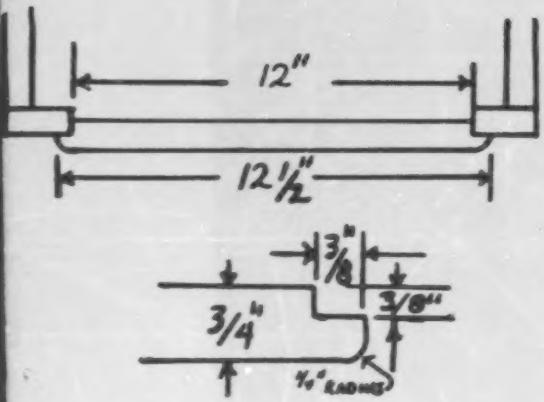
SAFETY PRECAUTIONS:

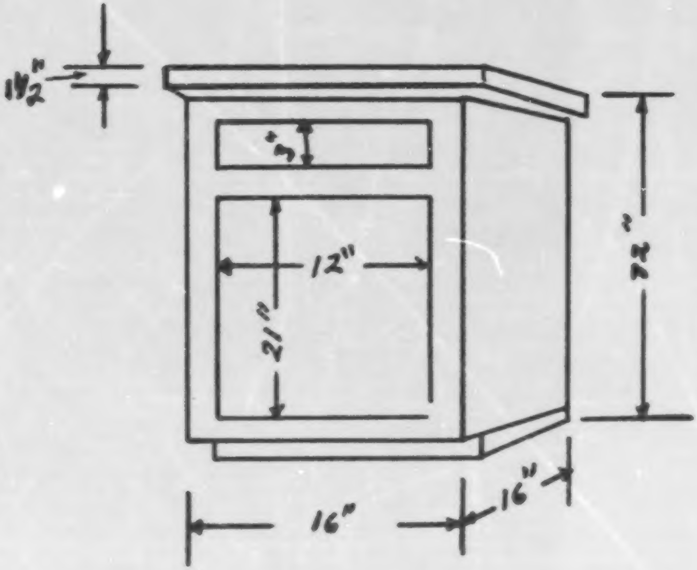
Remember safety rules for power tools and general hand tool safety.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Check drawing for door opening dimensions. See sketch.	
2. Lay out 3/4" plywood to overall door size 12 1/2" X 21 1/2".	NOTE: Add 1/2" to door opening width and length to arrive at overall door size. See D-9-44.
3. Cut door to width using circular saw.	
4. Cut door to length with radial saw inside.	
5. Rabbett four inside edges of door. 3/8" X 3/8".	NOTE: Rabbetting and rounding over may be done on the shaper, portable router, sawed on a table saw with a planer blade, or, with a molding head on table saw.
6. Round over four outside edges of door. (1/4" radius.)	
7. Sand all rabbets and rounded edges.	
8. Lightly sand the surface to remove smudges.	NOTE: Be careful while sanding edges of plywood so as not to get splinters.

METHOD OF EVALUATION:

Finished door will be checked for overall dimension, size of rabbett and neatness.


12"
12 1/2"
3/8"
3/8"
3/4"
1/4" RADIUS


1 1/2"
4"
12"
21"
24"
16"
16"

LIPPED CABINET DOOR

DRAWING NUMBER

D-9-44

JOB: Hang A Cabinet Door

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Door from J-9-44
1 Pair, 3/8" Offset Cabinet Hinges
1 Door Pull
1 Magnetic Catch

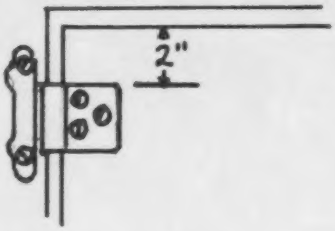
TOOLS: Screwdriver
Push Drill

JOB SHEET
IDENTIFICATION CODE

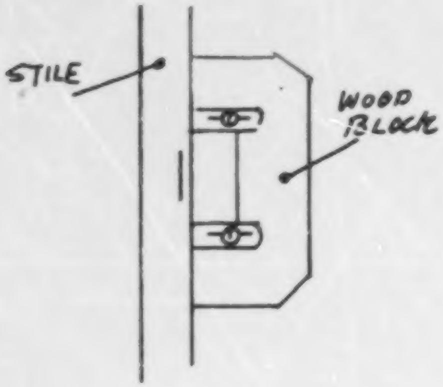
JOB NUMBER: J-9-45

SAFETY PRECAUTIONS:

1. Observe safety rules to protect yourself.
2. Observe safety rules to protect your work.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Note side to be hinged and type of hinges.	NOTE: Lipped doors will require 3/8" offset hinges.
2. Lay door face down on a smooth clean surface.	
3. Mark position of hinges from top down and from bottom up, on hinge side of door.	
4. Place hinges and drill pilot holes for screws.	
5. Fasten hinges with screws provided.	NOTE: The bottom hinge is often placed 1/2" more than the top dimension.
6. Set door in position in the opening, using a 1/8" shim to raise door to provide equal clearance top and bottom.	
7. Drill pilot holes and fasten hinges to cabinet face frame.	
8. Locate position of door pull and drill holes for screws or through bolts as required.	NOTE: Door pulls are placed slightly above center on base cabinet doors and about 1 1/4" in from the lip edge.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
9. Locate and install magnetic catch. Follow instructions on package. 10. Mount a small block of wood on the back of the stile if catch or strike plate is to be placed on the stile.	NOTE: There are several types of magnetic catches. For one type the magnetic part fastens to the door, while another type fastens to the underside of the shelf or cabinet stile.



METHOD OF EVALUATION:

1. Hinges are properly placed
2. Proper procedures followed
3. Catches installed properly

JOB: Make a Cabinet Drawer

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-46

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Student will make material list from drawings

EQUIPMENT: Power Tools

TOOLS: Finishing Tools

SAFETY PRECAUTIONS:

Safety and craftsmanship go hand in hand, if you are careless about one you will be careless about the other.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Study drawings to determine details and dimensions.	
2. Cut drawer front to overall size. See sketch. Fig. 1.	NOTE: Add 1/2" to overall width and length of drawer opening. See sketch. (3 1/2" X 12 1/2" X 3/4" white pine).
3. Cut 3/8" X 3/8" rabbets on top and bottom inside edges.	
4. Cut 3/8" x 3/4" rabbet on each end.	
5. Cut 2 drawer sides to width and length.	
6. Plane down to 3/8" thickness. Fig. 2.	
7. Cut grooves with table saw.	
8. Reset saw and cut groove in back of drawer front.	
9. Cut drawer back to width and length. Plane down to 3/8" thickness.	
10. Sand all parts and assemble using glue and nails.	
11. Measure and cut 1/4" plywood to size for drawer bottom.	

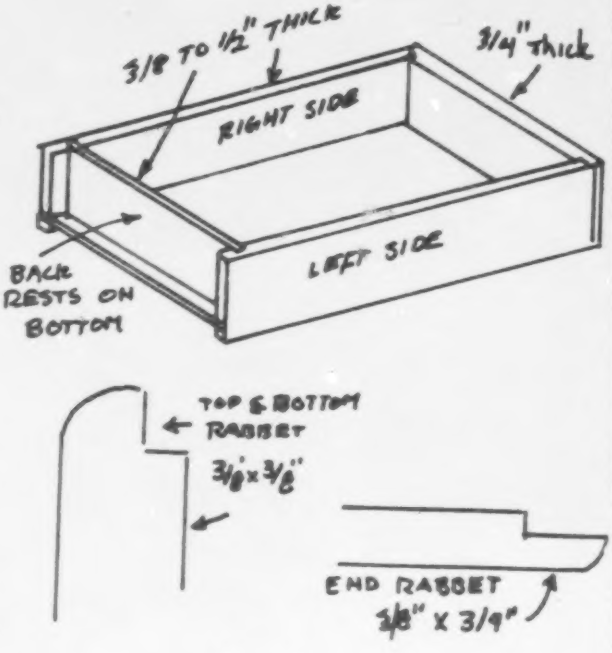


Fig. 1

12. Slide bottom under back and into grooves.

13. Nail bottom to underside of back.

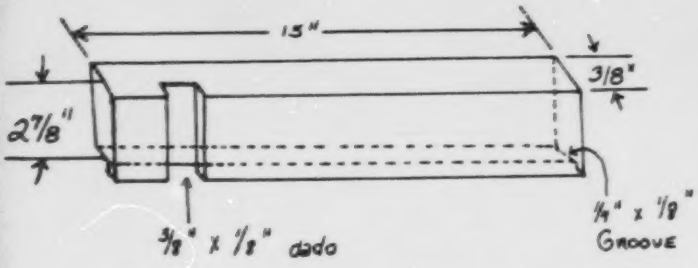
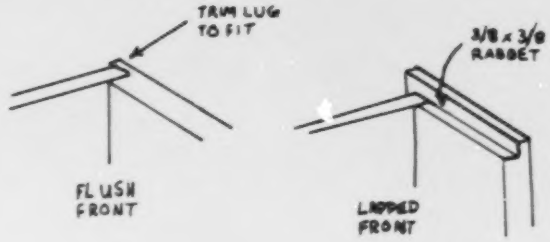
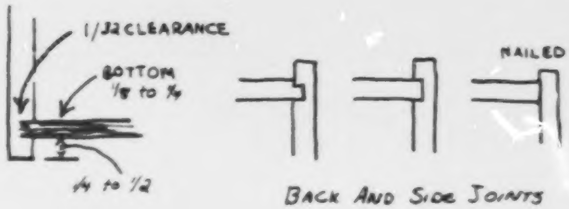
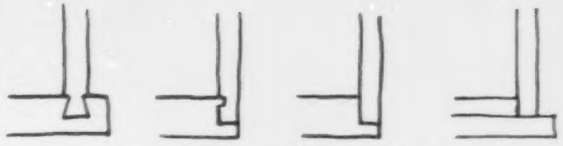

15"
3/8"
2 7/8"
3/8" x 1/8" dado
1/4" x 1/8" Groove

Fig. 2


TRIM LUG TO FIT
3/8 x 3/8 RABBET
FLUSH FRONT
LAPPED FRONT


1/32 CLEARANCE
BOTTOM 1/8 to 1/4
1/4 to 1/2
NAILED

Back And Side Joints



Front And Side Joints

METHOD OF EVALUATION:

Drawer will be checked for neatness and accuracy.

JOB: Install Roller Drawer Guides

UNIT IX: Interior Finish

COURSE: Carpentry

JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-47

DRAWING NO.: D-9-47

EQUIPMENT: Power Saw Jointer

TOOLS: Finish Hand Tools

SAFETY PRECAUTIONS:

Observe all safety rules concerning power tools.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Read manufacturers instructions.	
2. Remove parts from package.	
3. Install two rollers at right and left sides of drawer opening. Fig. 1.	
4. Mount center roller on back of drawer.	
5. Mount rear track bracket to back of cabinet.	
6. Insert track into rear bracket and fasten to front drawer rail.	
7. Place drawer into opening and check for alignment.	

METHOD OF EVALUATION:

Drawer will be checked for alignment and ease of operation.

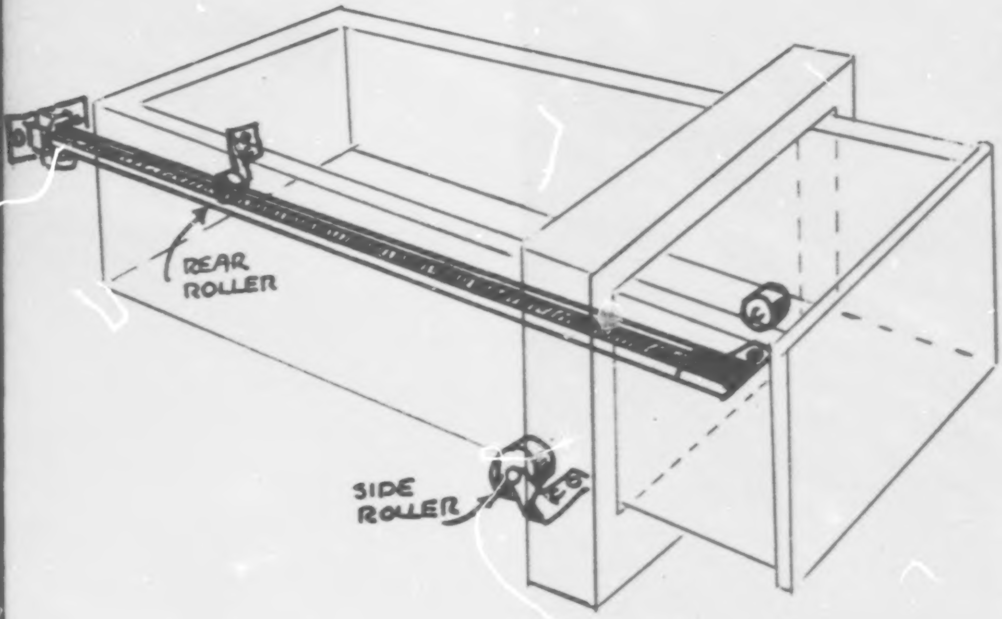

REAR ROLLER
SIDE ROLLER

Fig. 1.

THREE ROLLER DRAWER GUIDE ASSEMBLY

DRAWING NUMBER
D-9-47

JOB: Build Kitchen Base Cabinets

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-48

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: As Prescribed By Plan

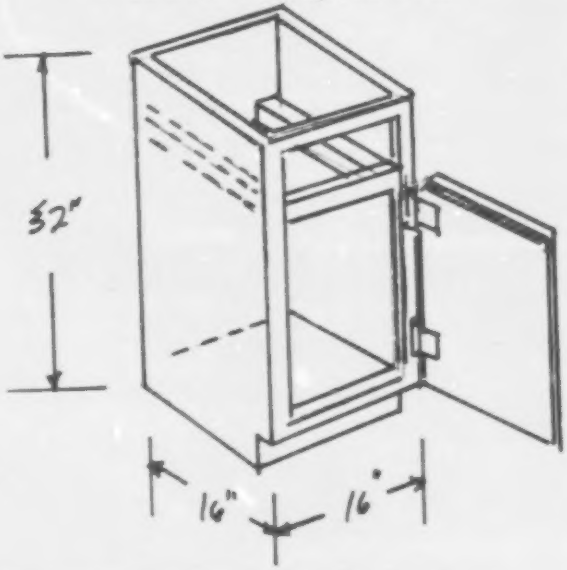
EQUIPMENT: Table Saw
Jointer
Radial Arm Saw
Mortising Machine

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Observe all safety rules prescribed for each machine.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Construct the front frame, using mortice and tennon joints.	. SC-9-30
2. Cut cabinet ends and bottom.	. SC-9-35 through SC-9-39
3. Lay out and cut dado to receive bottom shelf.	
4. Cut wall cleat and toe board.	
5. Fasten ends and bottom.	
6. Fasten wall cleat and toe board.	
7. Cut and fasten front frame and back.	
8. Install drawer guides.	
9. Construct, fit and install drawer.	
10. Cut, fit and install cabinet doors and hardware.	
11. Set nails and sand work.	



METHOD OF EVALUATION:

1. Preparation
2. Accuracy
    a. measurements
    b. cuts
    c. fit
3. Appearance

JOB: Build a Counter Top

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: As Prescribed by Plan

EQUIPMENT: Table Saw Radial Arm Saw
Laminate Trimmer

TOOLS: Basic Tool Kit

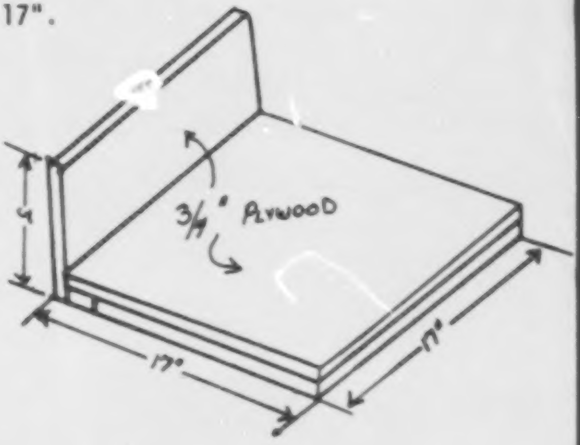
JOB SHEET IDENTIFICATION CODE

JOB NUMBER: J-9-49

SAFETY PRECAUTIONS:

Observe all safety rules prescribed for each machine.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Measure and cut 3/4" plywood to size, 17" X 16 1/4".	. SC-9-40
2. Cut, glue and nail filler pieces around edges, 3/4" X 3".	. IL-9-22
3. Cut and fasten backsplash, 3/4" X 3" X 17".	



METHOD OF EVALUATION:

1. Layout and measurements
2. Laminate fit
3. Fastening practices
4. Trimming practices
5. Appearance

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-50

JOB: Install Plastic Laminate

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: Plastic Laminate
Contact Cement

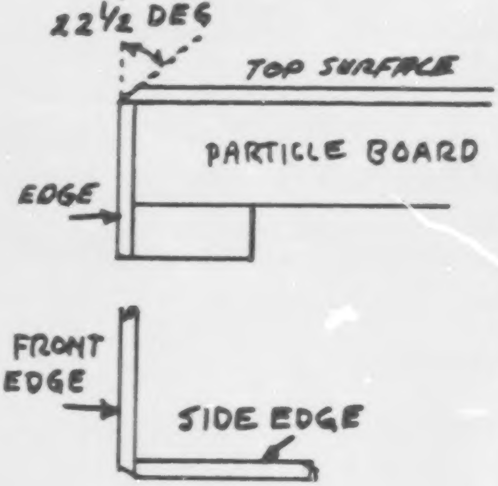
EQUIPMENT: Laminate Trimmer

TOOLS: Roller
File

SAFETY PRECAUTIONS:

1. Beware of sharp edges on laminate.
2. Use router safely.
3. Do not breath cement fumes.

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Measure top to be covered.	NOTE: All material should be cut 1/8" to 1/4" oversize to allow for triming.
2. Layout material to its best advantage with the least amount of waste.	
3. Put cement on side edges of top with a brush or small roller.	NOTE: Plastic laminates can be cut with a hand saw, table saw, portable saw or a regular laminate shears.
4. Put cement on plastic laminate strip and let dry (usually 10 to 15 minutes).	NOTE: If material is porous it will require two coats on edge. The entire surface should be completely covered with a glossy film.
5. Apply strip by starting at one end and gradually letting it come in contact with the edge.	
6. Apply pressure on entire strip with a roller.	
7. Trim edges with a router.	
8. Put front edge on.	
9. Spread cement on the top with a metal spreader or roller.	
10. Spread cement on plastic laminate.	
11. Let dry.	
12. Lay thin strips on the top about one foot apart.	



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
13. Lay plastic laminate on top of strips and position in place.	
14. Start at one end and gradually pull one strip out one end at a time, pressing laminate down as you go.	
15. Use a roller and start in the middle and apply pressure working out to the edges.	NOTE: It is important that the cement is dry on both surfaces before putting the laminate on the top. Check by pressing a piece of paper lightly against the coated surface. If no adhesive sticks to the paper it is ready to be bonded.
16. Trim and file edges.	

METHOD OF EVALUATION:

The instructor will check for neatness and accuracy of finished product.

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-51

JOB: Build Wall Cabinets

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: As Prescribed by Plan

EQUIPMENT: Table Saw, Jointer, Radial Arm Saw, Mortising Machine

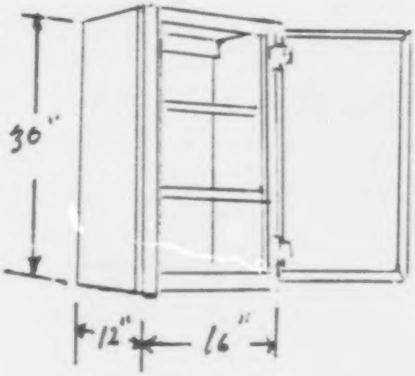
TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Observe all safety rules prescribed for each machine.

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Study plans.
2. Construct the front frame.
3. Cut cabinet ends.
4. Cut top, bottom and middle shelves.
5. Cut wall cleat.
6. Lay out and cut dadoes to receive top, bottom and middle shelves.
7. Assemble basic cabinet and front frame.
8. Cut and fasten back.
9. Cut, fit and install door and hardware.
10. Set nails and sand work.



METHOD OF EVALUATION:

1. Preparation
2. Accuracy
   a. measurements
   b. cuts
   c. fit
3. Appearance

JOB: Install Factory Made Cabinets

UNIT IX: Interior Finish

COURSE: Carpentry

MATERIAL: As Prescribed by Plan

EQUIPMENT: Table Saw
Jointer
Radial Arm Saw

TOOLS: Basic Tool Kit

SAFETY PRECAUTIONS:

Care in the proper lifting of heavy cabinets

JOB SHEET
IDENTIFICATION CODE

JOB NUMBER: J-9-52

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

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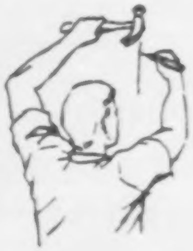
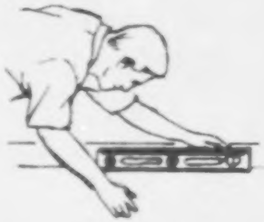
1. Locate the position of all wall studs where cabinets are to hang by tapping with a hammer. Mark their position where the marks can easily be seen when the cabinets are in position.



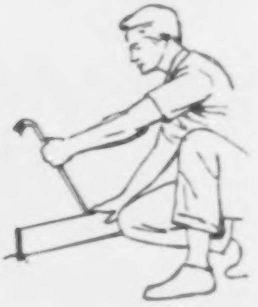
2. Find the highest point on the floor with a level.



NOTE: This is important for both base and wall cabinet installation later.

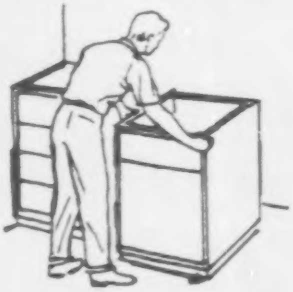
3. Remove the baseboard from all walls where cabinets are to be installed.

NOTE: This will allow them to go flush against the walls.

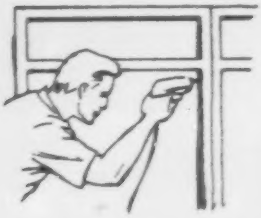


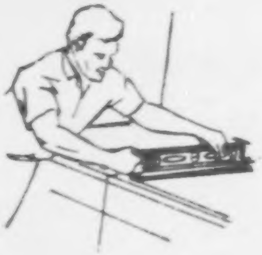
4. Start the installation with a corner or end unit. Slide it into place then continue to slide the other base cabinets into the proper position.

5. When all base cabinets are in position, fasten the cabinets together. This is done by drilling a ¼" diameter hole through the face frames and using the 3" screws and T-nuts provided. To get



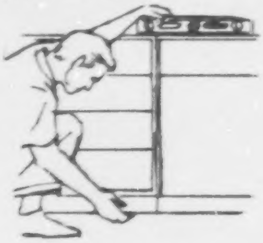
NOTE: To get maximum holding power from the screw, one hole should be close to the top of the end stile and one should be close to the bottom.



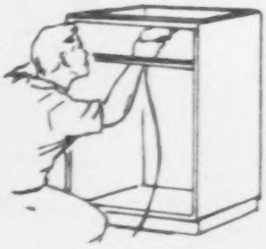


6. Check the position of each cabinet with a spirit level, going from the front of the cabinet to the back of the cabinet. Next shim between the cabinet and the wall for a perfect base cabinet installation.

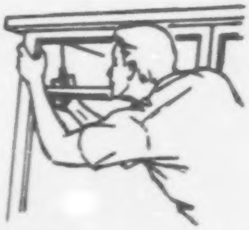
7. Starting at the high point in the floor, level the leading edges of the cabinets. Continue to shim between the cabinets and the floor until all the base cabinets have been brought to level.



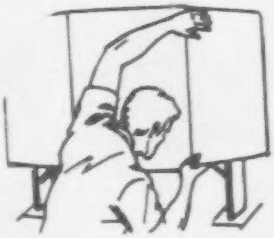
8. After the cabinets have been leveled, both front to back and across the front, fasten the cabinets to the wall at the stud locations. This is done by drilling a 3/32" diameter hole 2¼" deep through both the hanging strips for the 2½" x 8 screws that are provided.



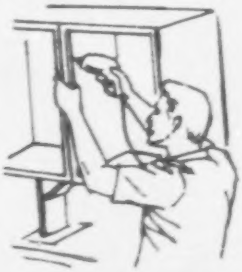
9. Fit the counter top into position and attach it to the base cabinets by predrilling and screwing through the front corner blocks into the top. Use caution not to drill through the top. Cover the counter top for protection while the wall cabinets are being installed.



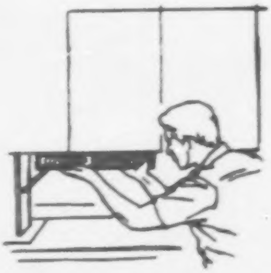
10. Position the bottom of the 30" wall cabinets 19" from the top of the base cabinet, unless the cabinets are to be installed against a soffit. A brace can be made to help hold the wall cabinets in place while they are being fastened. Start the wall cabinets installation with a corner or end cabinet. Use care in getting this cabinet installed plumb and level, since this is the key for the entire installation.



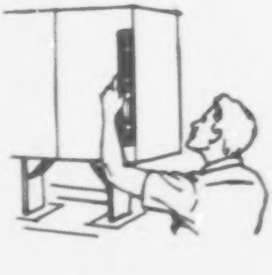
11. Temporarily secure the adjoining wall cabinets so that leveling may be done without removing them. Drill through the end stiles of the cabinets and fasten them together as was done with the base cabinets.



12. Use a spirit level to check the horizontal surfaces. Shim between the cabinet and the wall until the cabinet is level. This is necessary if doors are to fit properly.



13. Check the perpendicular surface of each frame at the front. When the cabinets are level, both front to back and across the front, permanently attach the cabinets to the wall. This is done by predrilling a 3/32" diameter hole 2¼" deep through the hanging strip inside the top and below the bottom of the cabinets at the stud location. Enough number 8 screws should be used to fasten the cabinets securely to the wall.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

1. Cabinets are plumb and level.
2. Cabinets were properly installed flush with the walls.
3. Overall appearance of cabinets

OPERATION SHEET
SC-2-1

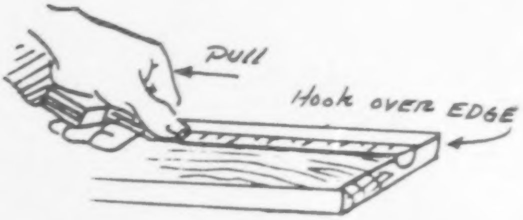
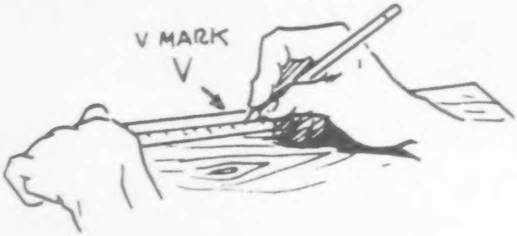
COMPETENCY: Lay Out Stock to Length

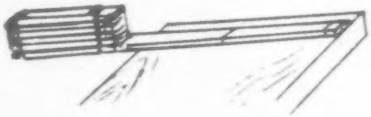
COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

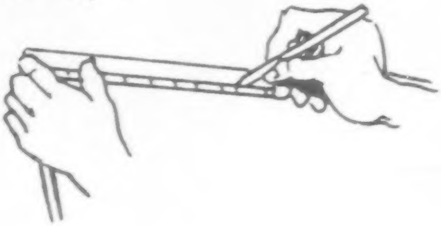
OBJECTIVE: The student will be able to measure and mark stock to specifications without error

Page 1 of 3 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
MEASURE:	
1. Using steel tape;	
A. Hook the end of the tape on to the end of the stock and extend the tape by pulling on the case.	NOTE: The tape should lay parallel to the edge of the stock.
	
B. Place a mark on the stock close to the edge of the tape at the desired dimension.	NOTE: A "V" mark is used by many carpenters with the point of the "V" indicating the exact measurement.
	
2. Using folding rule;	
A. Open enough sections of the rule to take the measurement.	
B. Place the rule flat on the stock, parallel to the edge and with the end of the rule even with the end of the stock.	



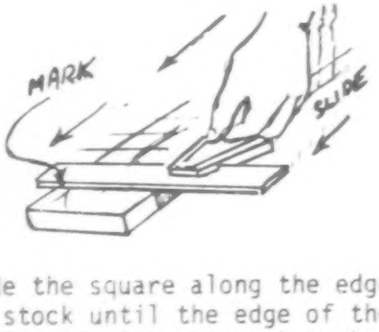
C. Place a mark on the stock close to the edge of the rule as with a steel tape.



SQUARE A LINE:

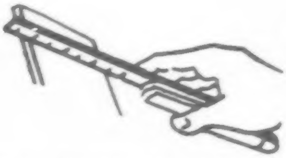
1. Using try square or combination square;

A. Place the head of the square against the edge of the stock.

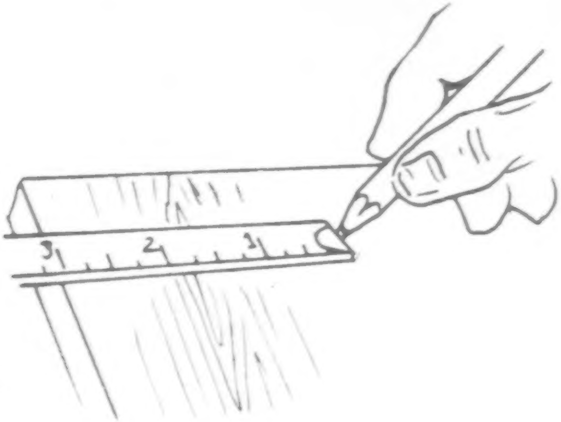


B. Slide the square along the edge of the stock until the edge of the blade is aligned with the mark to be squared.

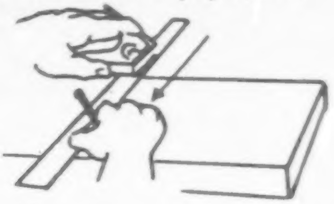
NOTE: More accurate measurements can be taken with the rule held on edge.



NOTE: Another method commonly used when using the folding rule is to place the rule in position so the desired dimension is even with the end of the stock; then placing a mark at the end of the rule.



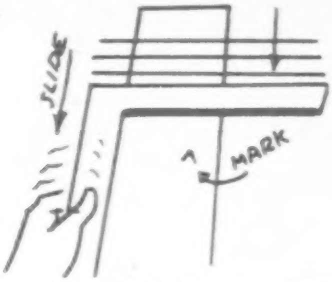
C. Mark a line along the edge of the blade with a sharp pencil.



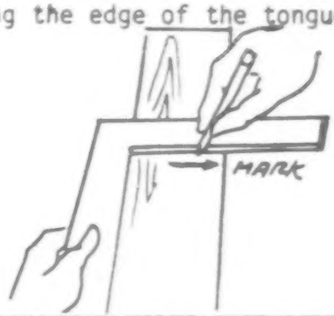
2. Using Framing Square;

A. Place the inside edge of the blade against the edge of the stock.

B. Slide the square along the stock until the edge of the tongue is aligned with the mark to be squared.



C. Mark along the edge of the tongue.



NOTE: A square line may be laid out on wider stock by placing the tongue of the framing square against the edge of the stock and marking along the blade.

When squaring a line on thin material, aling the outer edge of the blade even with the edge of the material and mark along the tongue.

METHOD OF EVALUATION:

1. Interpretation of drawings
2. Correct tools selected
3. Accuracy of measurements
4. Correct use of tools

OPERATION SHEET
SC-2-2

COMPETENCY: Lay Out Stock to Width

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

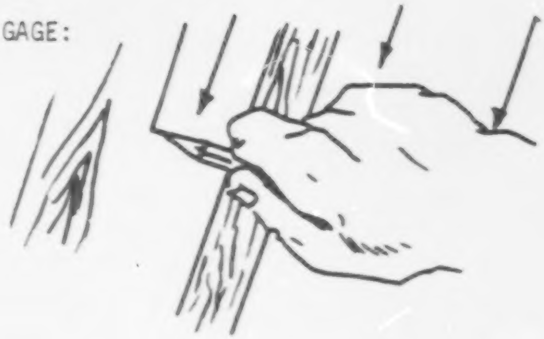
OBJECTIVE: The student will be able to place a mark on a piece of stock which will be used as a guide for cutting, shaping, drilling or assembling

Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

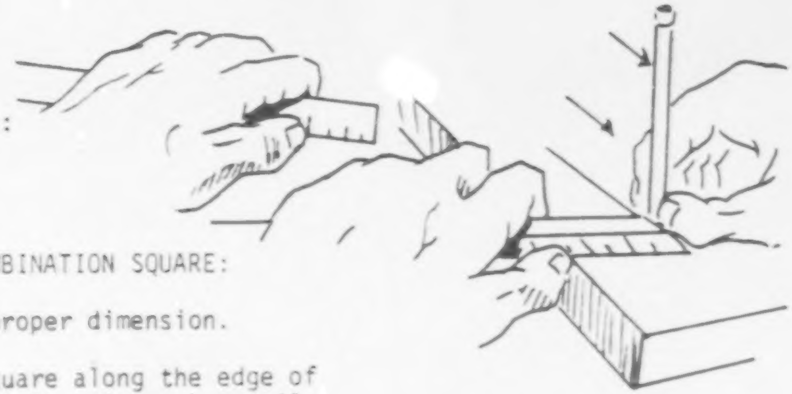
NOTE: The pencil, the ruler, the combination square and the marking gage are the tools most often used by the carpenter to lay out stock to width.

1. PENCIL GAGE:



- . Stanley Tool Guide
- . IL-2-3
- . IL-2-4

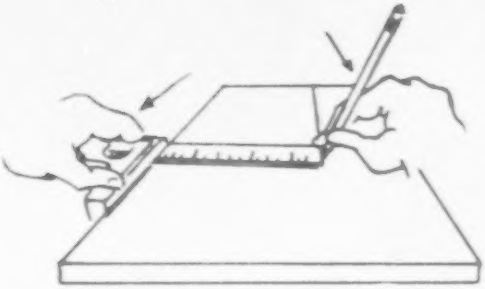
2. GAGE WITH A RULE AND PENCIL:



3. GAGE WITH A COMBINATION SQUARE:

   A. Adjust to proper dimension.

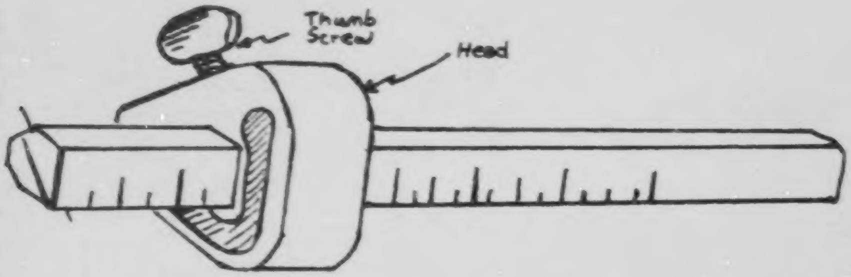
   B. Draw the square along the edge of the board while holding a pencil against the end of the blade.



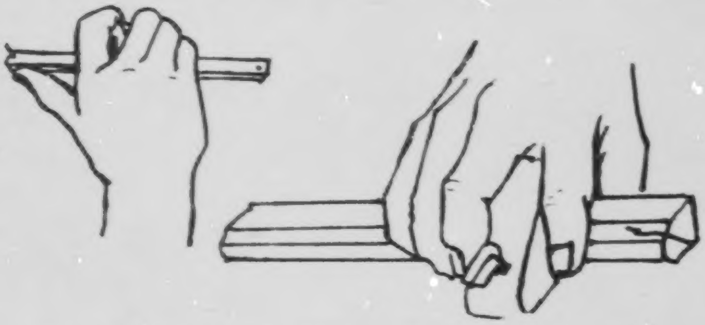
COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

4. GAGE WITH MARKING GAGE

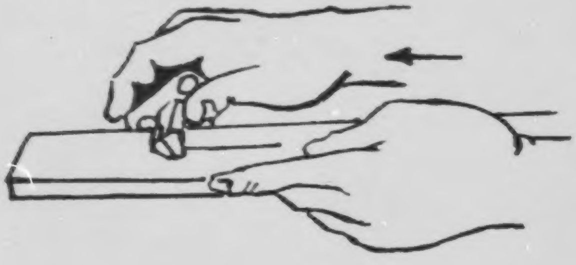
A. Adjust the head on the beam and tighten the the screw.



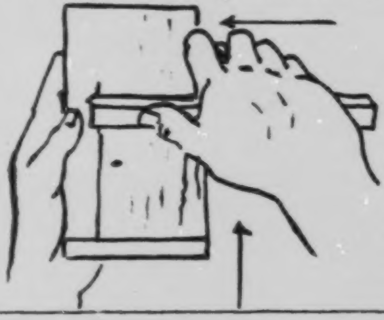
B. Hold the gage with fingers around the head and thumb behind the pin on the beam.



C. Mark a line, pushing the gage forward with the head held tight against the work.



NOTE: Hand pressure should be kept even over the head of the gage. Do not bear down too heavily on the pin; it will tend to follow the grain of the wood.



METHOD OF EVALUATION:

1. Accuracy of work

OPERATION SHEET
SC-2-3

COMPETENCY: Cut Stock to a Line With a Handsaw

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

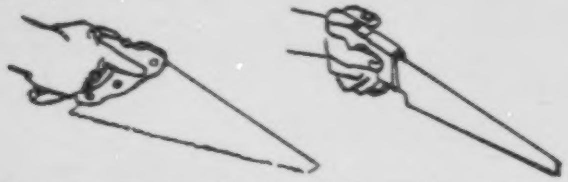
OBJECTIVE: The student will be able to cut stock accurately

Page 1 of 3 pages

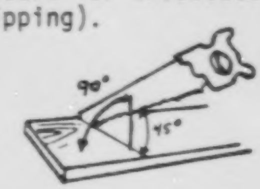
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

CUT WITH A HANDSAW

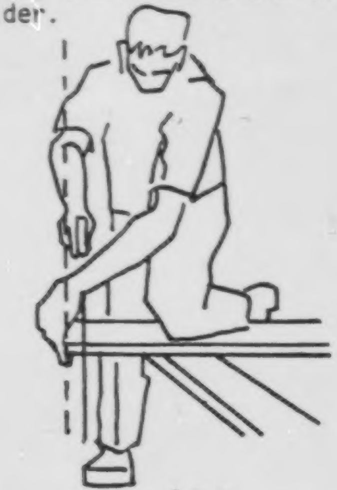
1. Place material on saw horse or clamp in a bench vise.
2. Hold the saw with the thumb and forefinger extended along the side of the handle.

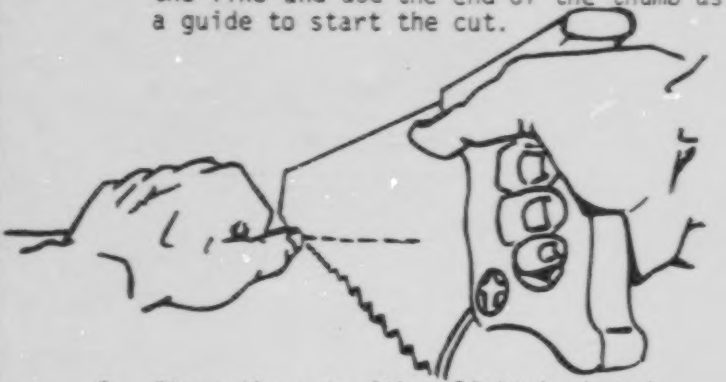
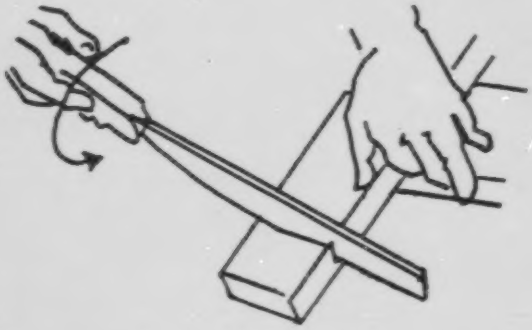
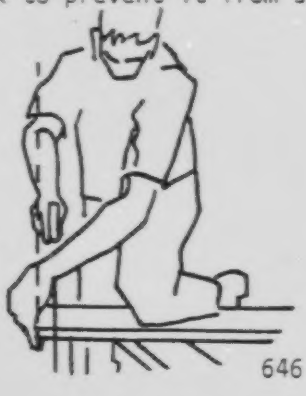


3. Hold the saw at about a 45° angle with the face of the board for crosscutting (about 60° for ripping).



4. Be positioned so that a straight line is formed from the tip of the saw through the handle, the forearm, and the tip of the shoulder.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
5. Position the cutting edge of the saw against the stock on the waste side of the line and use the end of the thumb as a guide to start the cut. 	
6. Start the cut with a light backward stroke.	NOTE: The strokes at the beginning should be short and light, gradually becoming longer and heavier as the cut is made.
7. Using a slight twisting motion bring saw back to line. 	NOTE: The bottom of the handle should be twisted in the direction you wish the saw to travel.
8. When near the end of the cut, take light strokes and support the end of the work to prevent it from splitting. 	

COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

CUT WITH A BACKSAW

1. Grasp the handle of the backsaw in the right hand in the same manner as done with any other handsaw.
2. Place a scrap board or bench hook under the material being cut.
3. Hold the material with the left hand allowing the thumb to act as a guide to start the cut.
4. Start the cut by raising the handle of the saw slightly and cutting on the opposite side.
5. Gradually lower the handle until the cutting edge is parallel with the surface of the stock.
6. After the kerf is made, keep the saw in the full length of the kerf by using long horizontal strokes.
7. Keep the saw positioned in the kerf so that the face of the blade is square with the surface of the material being cut.

NOTE: A piece of stock with a squared edge or end may be clamped in place along the layout line. This acts as an excellent guide for a backsaw.

METHOD OF EVALUATION:

1. Sawing technique
2. Accuracy of cut
3. Appearance of cut

OPERATION SHEET
SC-2-4

COMPETENCY: Plane Edges with a Hand Plane

COURSE: Carpentry

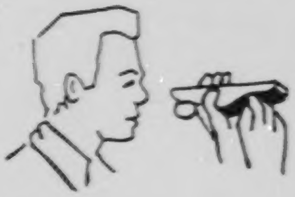
UNIT II: Hand and Machine Tool Processes

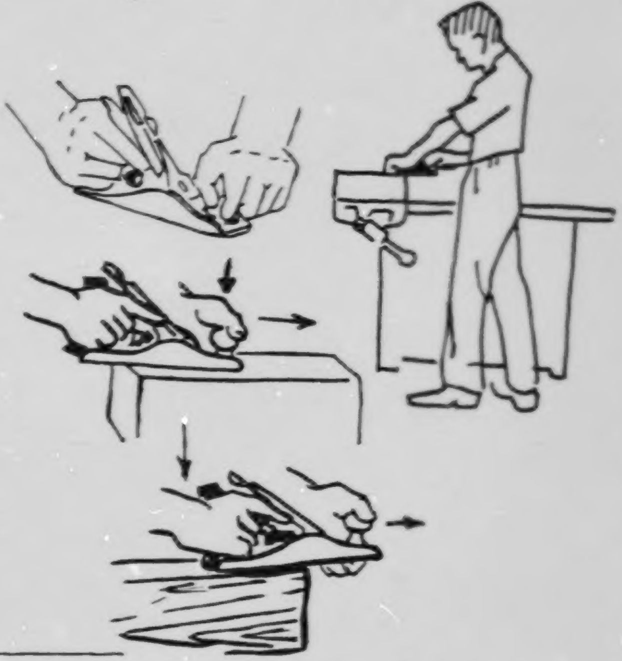
OBJECTIVE: The student will be able to accurately plane stock to meet requirements for sanding, assembling or finishing

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

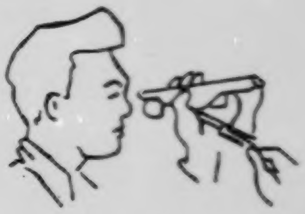
1. Select a hand plane suited for the job.
2. Adjust the plane to take a thin cut.
3. Clamp the stock in a bench vise, edge up.
4. Stand in a comfortable position with one foot slightly ahead of the other.
5. Hold the handle of the plane with one hand and the knob at the front of the plane with the other.
6. When progressing through the cut, apply most of the force to the front of the plane, apply force to both hands equally and then at the end of the cut, force should be applied only to the rear of the plane. The weight of the body at this point should shift to the front foot.
7. Bevel edge of a board by adjusting the lateral adjusting lever.





METHOD OF EVALUATION:

1. Selection of plane
2. Blade
   a. sharpness
   b. adjustment
3. Planing technique
4. Accuracy



OPERATION SHEET
SC-2-5

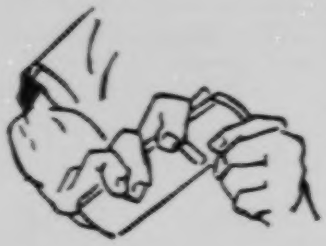
COMPETENCY: Plane End of Stock With a Block Plane

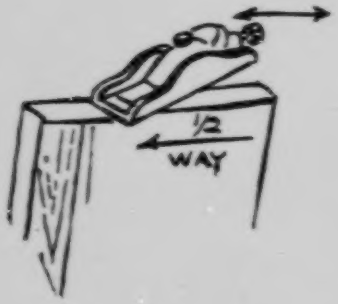
COURSE: Carpentry **UNIT II:** Hand and Machine Tool Processes

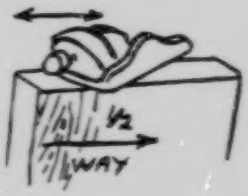
OBJECTIVE: The student will be able to accurately plane end grain prior to assembly or finishing

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Adjust the block plane to take a thin cut.	
2. Clamp the material to be planed in a bench vise or support it on a sawhorse.	NOTE: If the material is clamped, the second hand may be used to help hold the plane square.
3. Hold the block plane cupped in one hand with the thumb and middle fingers resting in the grooves in the side of the plane and the index fingers resting on the front knob.	
4. Hold the plane at a slight angle so as to produce a shearing cut.	
5. Plane half way from each edge to prevent splitting.	







METHOD OF EVALUATION:

1. Selection of plane
2. Blade
   a. sharpness
   b. adjustment
3. Planing technique
4. Accuracy

OPERATION SHEET
SC-2-6

COMPETENCY: Chamfer and Bevel with Hand Plane

COURSE: Carpentry

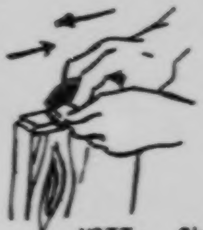
UNIT II: Hand and Machine Tool Processes

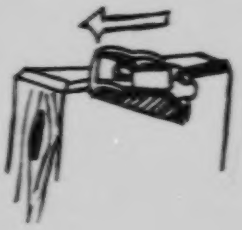
OBJECTIVE: The student will be able to accurately plane a chamfer and bevel on stock to meet specifications

Page 1 of 1 page

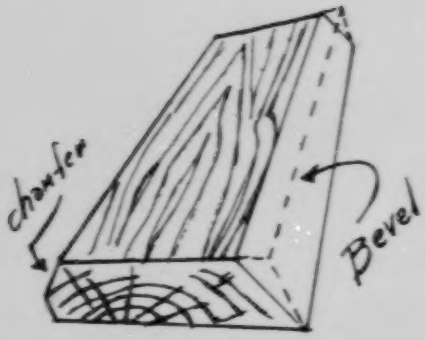
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

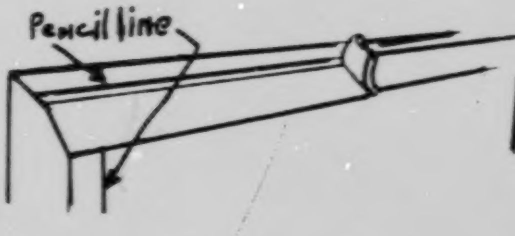
1. Select a plane suited to the job.
2. Lay out lines indicating the size of the chamfer or bevel.
3. Clamp the material in a bench vise.
4. Adjust the plane to take a rather heavy cut to begin then taking thinner cuts as layout lines are approached.
5. When chamfering or beveling end grain, hold the plane at a slight angle to the direction of the cut.

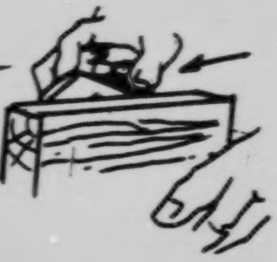




NOTE: Chamfering the edges of the stock first will allow you to chamfer the ends without danger of splitting.
NOTE: Keep blades sharp. Check material for nails or obstructions.







METHOD OF EVALUATION:

1. Selection of plane
2. Blade
   a. sharpness
   b. adjustment
3. Planing technique
4. Accuracy

OPERATION SHEET
SC-2-7

COMPETENCY: Use a T-Bevel to Lay Out Duplicate Angle

COURSE: Carpentry

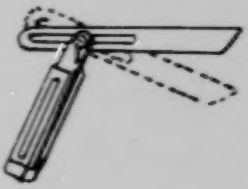
UNIT II: Hand and Machine Tool Processes

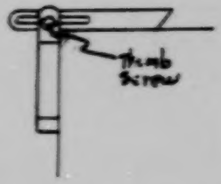
OBJECTIVE: The student will be able to correctly duplicate angles

Page 1 of 1 page

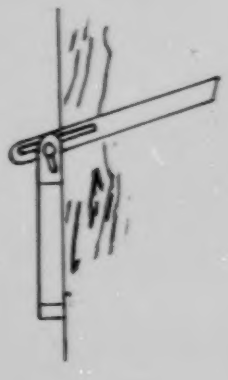
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

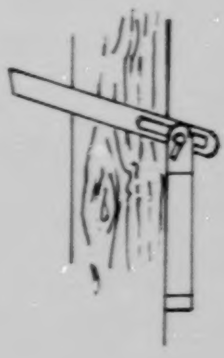
1. Loosen the thumbscrew and turn the blade to the desired angle then tighten the thumbscrew.
2. Place the T-bevel handle against the edge of the board with the blade across the surface.
3. Draw a line along the edge of the blade.
4. Layout duplicate angles in the opposite direction by reversing the direction of the handle.

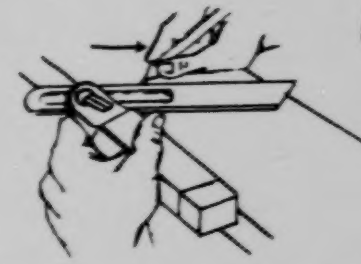


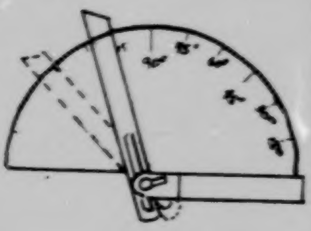


NOTE: Use a protractor, a square, or a draftsman's 30°-60° angle to set the T-bevel to the desired angle. A line which had previously been laid out or a board which had previously been cut may also be used.









METHOD OF EVALUATION:

1. Tool adjustment
2. Accuracy of measurements

OPERATION SHEET
SC-2-8

COMPETENCY: Sand Wood by Hand

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to hand sand wood to finish smoothness

Page 1 of 1 page

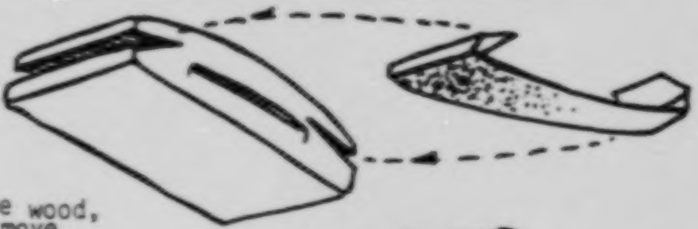
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

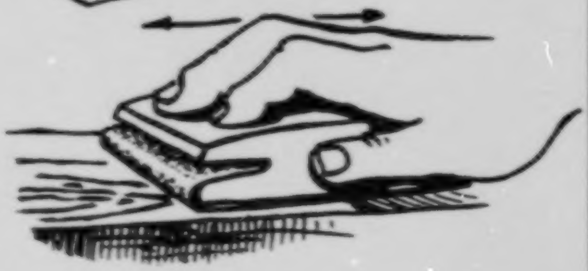
SAND A FLAT SURFACE:

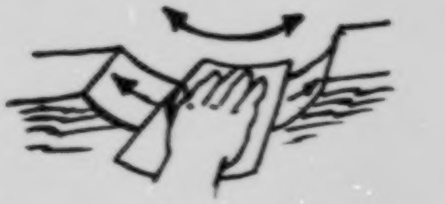
1. Select suitable abrasive.
2. Attach paper to sanding block.
3. Holding the sandpaper against the wood, apply pressure to the block and move it back and forth with the grain.
4. Sand the edges and ends carefully so as not round the corners.
5. Work from coarse to finer grit papers.

SAND CURVED SURFACES:

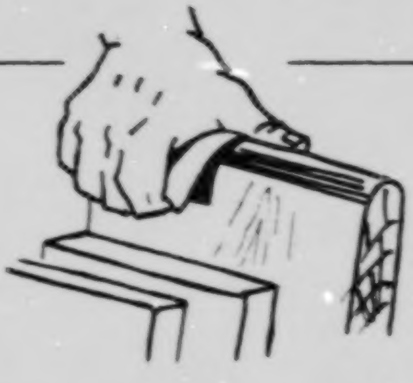
1. Select suitable abrasive papers.
2. Shape the paper to the curve with the palm of hand or fingers.
3. Keep an even pressure on the paper which is touching the wood.
4. Move the paper back and forth with the grain, being careful to retain the original shape of the curve.







NOTE: In some cases, the corners may need to be rounded slightly to avoid chipping and splintering.



METHOD OF EVALUATION:

1. Selection of abrasive paper
2. Tool selection
3. Sanding technique
4. Quality of finished job

OPERATION SHEET
SC-2-9

COMPETENCY: Drill Holes with a Hand Drill

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

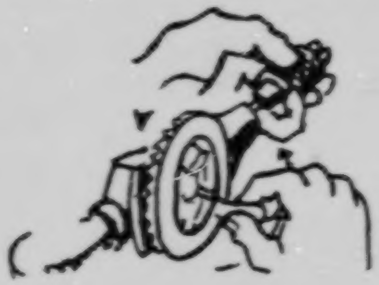
OBJECTIVE: The student will be able to drill a clean hole without splintering

Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

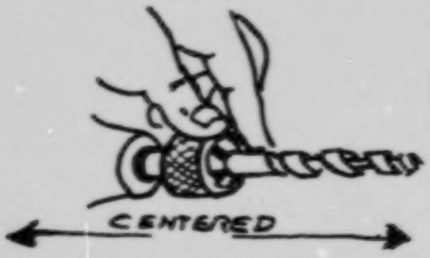
PUT IN THE DRILL BIT:

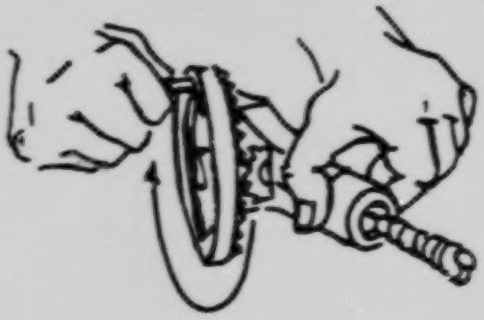
1. Open the chuck a little more than the size of the bit by holding the shell of the chuck between thumb and forefinger and turning the crank backwards with other hand.



2. Set the drill bit in.

3. Make sure the drill bit is centered and tighten it by holding the chuck shell between thumb and forefinger and pushing forward on the crank.



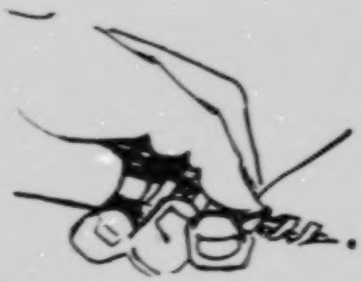


DRILL THE HOLE:

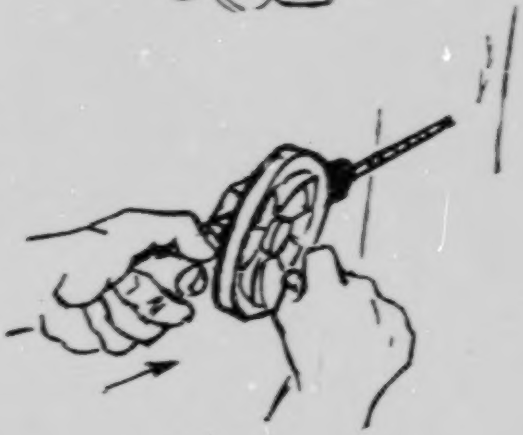
1. Start the hole with an awl (in wood) or a center punch (in metal).

COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

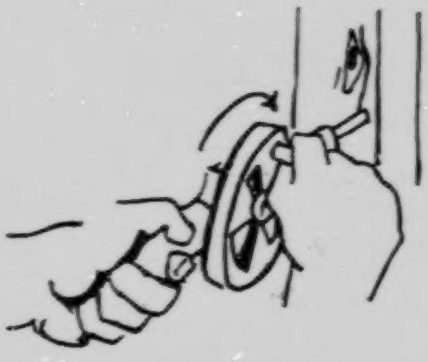
2. Line the bit up with the direction of the hole to be drilled.



3. Hold the drill steady and press evenly on it with one hand.



4. Turn the crank forward at a constant rate of speed while sighting the drill for squareness of drilling.



5. Lessen the pressure on the drill a little before breaking through the stock to keep the stock from splintering.

METHOD OF EVALUATION:

Operation will be checked for correct procedure.

OPERATION SHEET
SC-2-10

COMPETENCY: Bore Holes with Brace and Auger Bit

COURSE: Carpentry

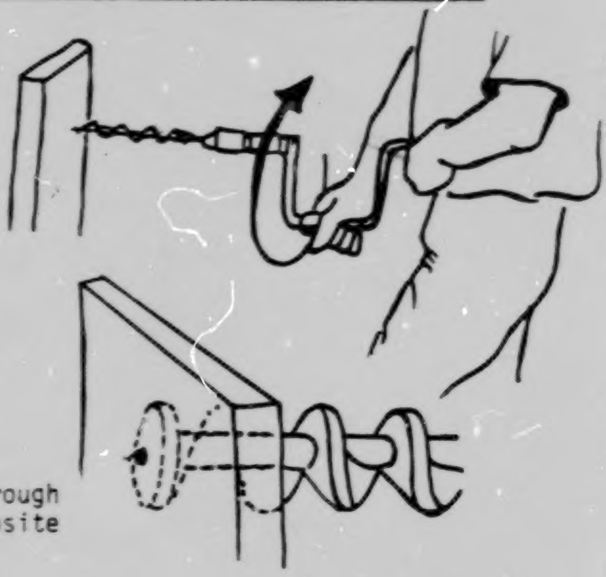
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to be competent in boring holes with a brace and bit

Page 1 of 1 page

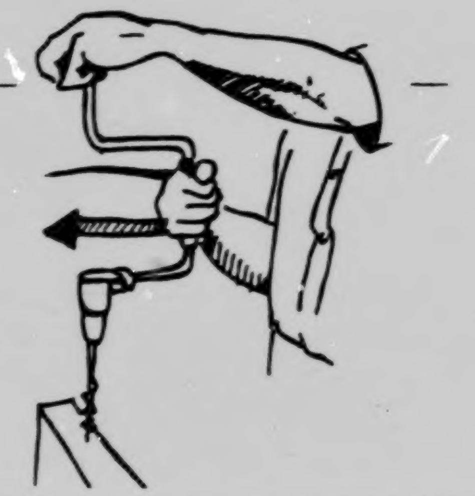
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Place the proper size auger bit in the chuck and tighten.
2. Bore in the horizontal position:
   - A. Hold the head of brace cupped in the left hand and supported against stomach.
   - B. Grasp the handle with right hand.
   - C. Turn the handle in a clockwise direction while applying forward pressure.
   - D. Bore through without splintering by stopping when the screw point is through the work and finishing from the opposite side.



3. Bore a vertical hole:
   - A. Align the bit in the direction the hole is to be drilled.
   - B. Cup the head of the brace in the left hand.
   - C. Apply downward pressure while turning the handle in a clockwise direction.

NOTE: Test for direction of drilling by comparing the direction of the bit to the nearest straightedge, the edge of the vise, or to a try square held near the bit.



METHOD OF EVALUATION:

1. Bit selection
2. Use of brace
3. Drilling accuracy

OPERATION SHEET
SC-2-11

COMPETENCY: Drill Holes with an Automatic Push Drill

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

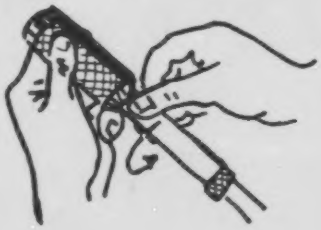
OBJECTIVE: The student will be able to gain skill in the use of the automatic push drill

Page 1 of 2 pages

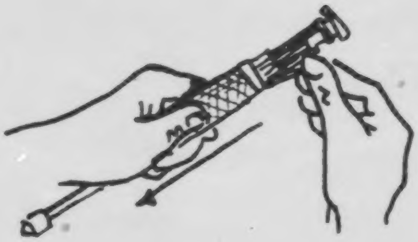
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

INSTALL DRILL POINTS:

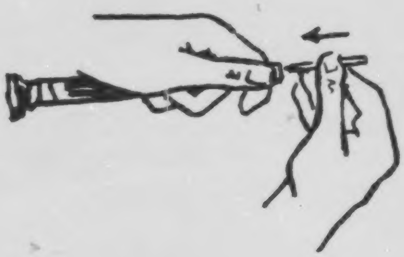
1. Open the magazine by holding the handle and turning the lockring to the left.



2. Pull the magazine handle down and take out a drill point.



3. Slide the magazine back in place and lock it by turning the lockring to the right.
4. Push the chuck sleeve forward. Put in the drill point and turn it until it is seated.

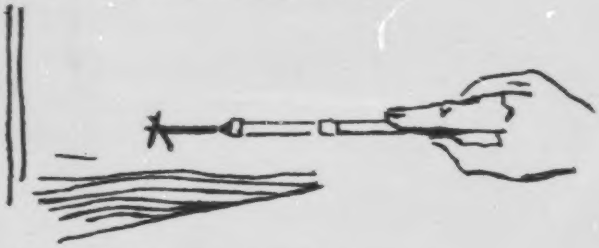


5. Release the chuck sleeve.

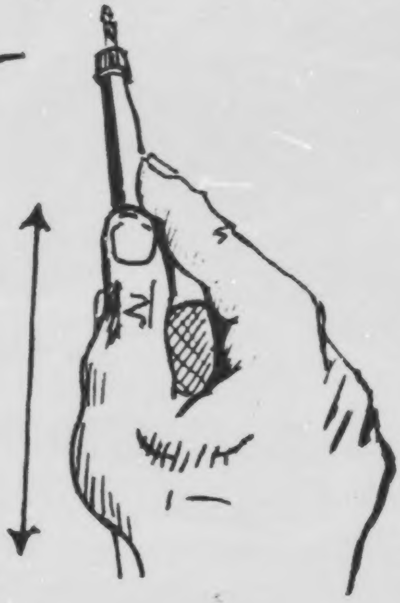
COMPETENCE - PROCEDURE/STEPS TEACHING/LEARNING ACTIVITIES

DRILL THE HOLE:

1. Put the drill point in position to drill the hole.

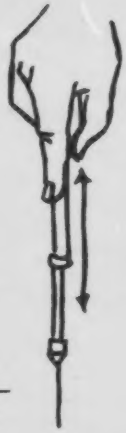


2. Begin to drill by applying pressure to the handle parallel to the drill point.



3. Use a push-pull motion to drill the hole.

4. Remove the drill by pulling it straight out of the hole.



METHOD OF EVALUATION:

Check for care and use of tool.

OPERATION SHEET
SC-2-12

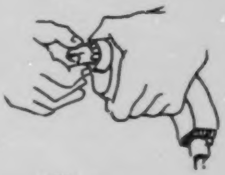
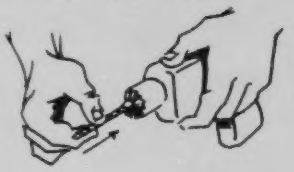
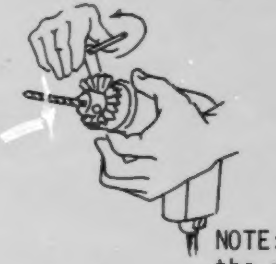
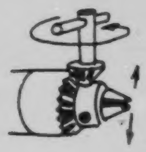
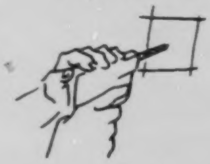
COMPETENCY: Drill Holes with an Electric Drill

COURSE: Carpentry

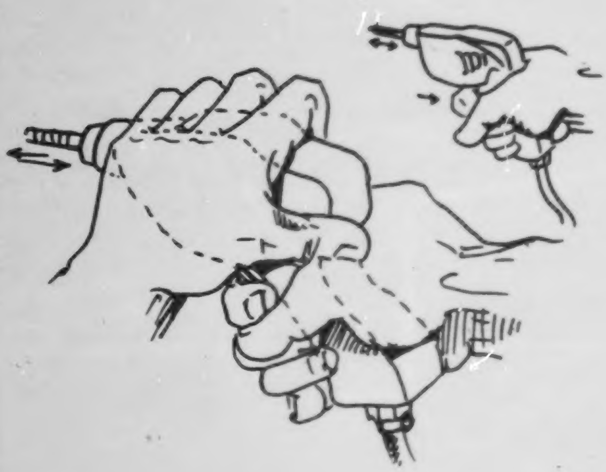
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to drill holes accurately and neatly with an electric drill

Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
INSTALL THE DRILL BIT:	CAUTION: Make sure the drill is unplugged.
1. Open the chuck by turning it counterclockwise with fingers.	NOTE: Open it until the drill bit will slide into the chuck.
2. Push the blunt end of the bit into the chuck until it bottoms.	 
3. Hold the bit in the center of the chuck and turn the chuck clockwise by hand.	
4. Tighten the chuck by turning the chuck key clockwise until it is tight.	 
5. With the switch off, place the point of the bit on the layout mark.	NOTE: Move the key to the next key guide and tighten it also.
6. Hold the drill with one or both hands.	
7. Align the bit in the direction the hole is to be drilled.	
8. Apply a light forward pressure, turn on the switch and feed the bit into the work.	
9. Keep the bit aligned in the direction the hole is to be drilled.	NOTE: The amount of pressure required will vary with the size of the drill and the material being drilled. Small diameter bits require little pressure. Larger bits require more. NOTE: Continue to apply pressure to the drill during the drilling operation.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
10. When drilling deep holes, withdraw the bit often to keep the hole clear of cuttings.	
11. When drilling completely through the material, ease up on the pressure as the point of the bit is about to break through the back of the material.	NOTE: To prevent splintering, clamp a piece of scrap wood to the back of the stock being drilled. NOTE: When using spade type bits, drill only until the point of the bit breaks through. Finish drilling the hole from the opposite side.



METHOD OF EVALUATION:

Operation will be checked for correct procedure and safety practices.

OPERATION SHEET
SC-2-13

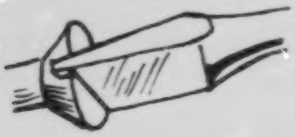
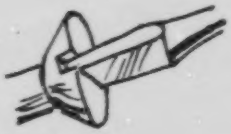
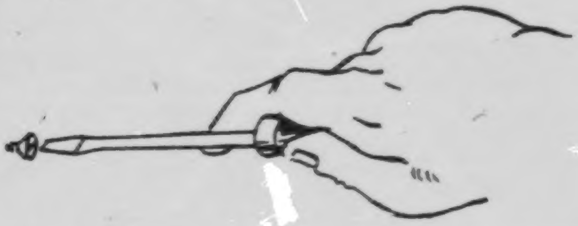
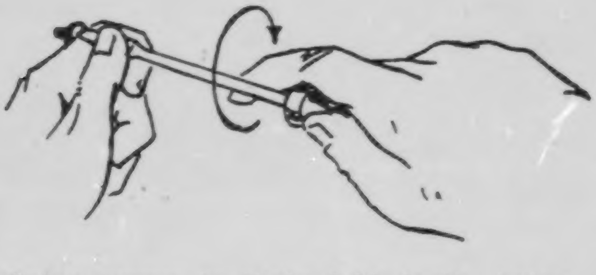
COMPETENCY: Drive and Remove Wood Screws with Screwdriver

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to install wood screws accurately

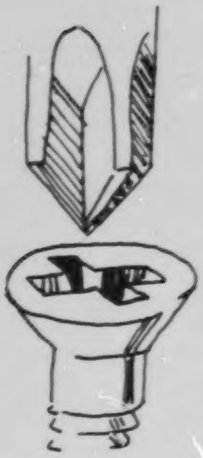
Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select a screwdriver fitted to the work.  Too Large  Too Small	NOTE: Screwdriver must fit the screwhead or damage will result. If the screwdriver is too small, it could be broken or the screw could be ruined. If the screwdriver is too big, the wood may be marred or the screw broken.
2. Hold the handle firmly in the palm with the thumb and forefinger extended along the handle. 	
3. Apply forward pressure while turning the screwdriver clockwise. 	NOTE: The left hand should be used to steady the tip of the screwdriver and to hold the tip in the slot when taking a new grip on the handle.
4. Drive screws to their full depth, being careful not to mar the screw head or the work.	NOTE: In hardwood, beeswax may be applied to the thread of the screw to make them easier to drive

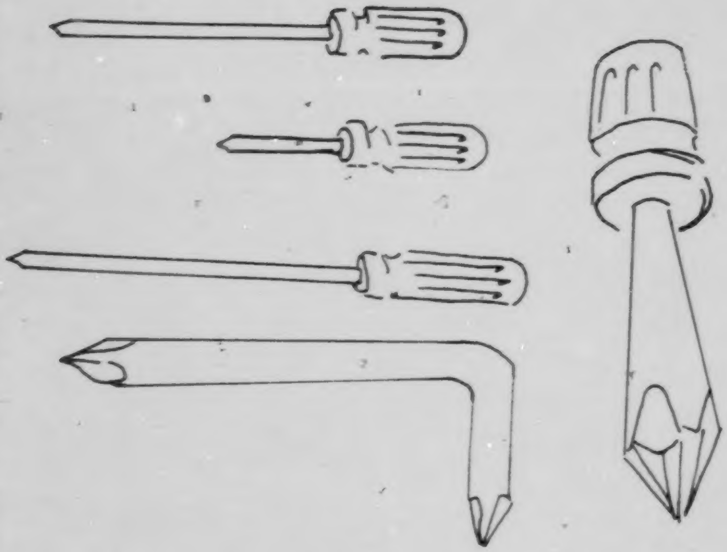
COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

NOTE: We use the phillips head screwdriver in the same way that we use the blade screwdriver.



NOTE: Be sure to hold the screwdriver straight; if the tip slips out of the slots, the screw will be damaged and serious injury is possible.



NOTE: Phillips head screwdrivers come in a wide variety of sizes also. Select carefully when you use the phillips head screwdriver.

METHOD OF EVALUATION:

1. Screw selection
2. Tool selection
3. Installing technique
4. No mars or marks

OPERATION SHEET
SC-2-14

COMPETENCY: Drive or Remove Screws with a Spiral Screwdriver

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to properly and safely use the spiral screwdriver

Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

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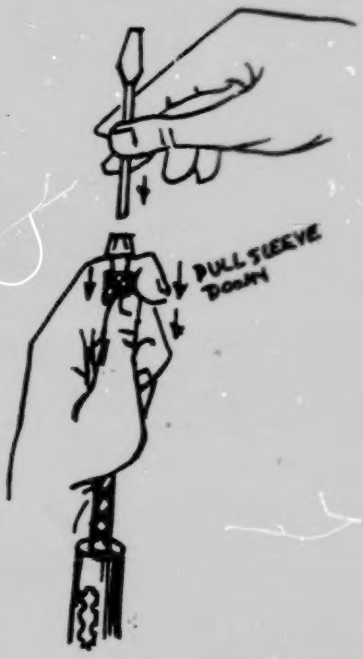
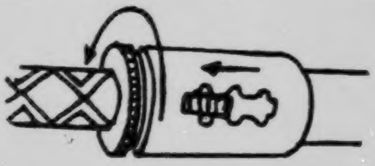
1. Pull back on the chuck sleeve, drop the bit in place and then release the chuck sleeve.



2. When driving a screw, put the direction lever in the "F" or forward position. (To release the lock ring, turn it).



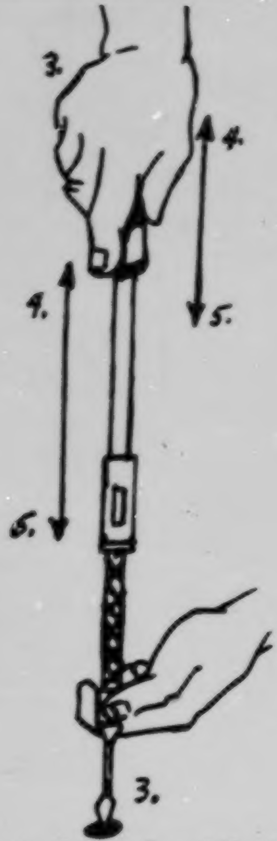
3. Cup the handle in one hand while guiding the blade into the screw slot with the other hand.

4. Hold the blade on the head of the screw while pulling the handle back.

5. Push the handle forward quickly. (Still guide the blade.)

CAUTION: DO NOT put any part of you hand on the spiral grooves behind the clutch sleeve. You could get your hand pinched.

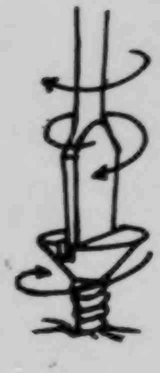
COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES



6. Repeat steps 4 and 5 until the screw is almost all the way into the wood.

7. Finish driving the screw by pushing the handle forward and turning the lockring to lock it.

8. Then, use it like an ordinary screwdriver.



9. Remove a screw after it has been started by putting the direction lever on "R" for reverse.

10. Holding the blade in the screw with one hand, gently push forward on the blade of the screwdriver while pushing the handle in and out.

NOTE: Steps 7 and 8 also are used to begin removing a screw.

NOTE: Ease off on the pressure as the screw comes out of wood.

METHOD OF EVALUATION:

Operation will be checked for procedure and safety.

OPERATION SHEET
SC-2-15

COMPETENCY: Clamp Pieces of Stock Face to Face

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

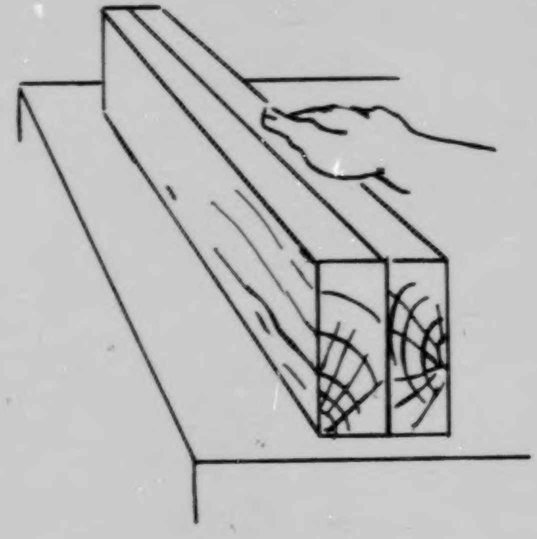
OBJECTIVE: The student will be able to correctly clamp pieces of stock face to face so that they are straight and even

Page 1 of 3 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

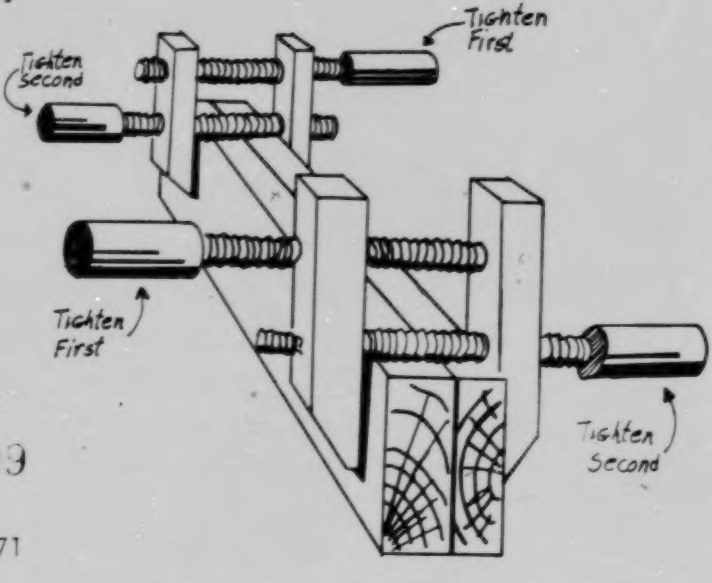
USING PARALLEL HAND SCREWS:

1. Place the stock on the bench or glue table.

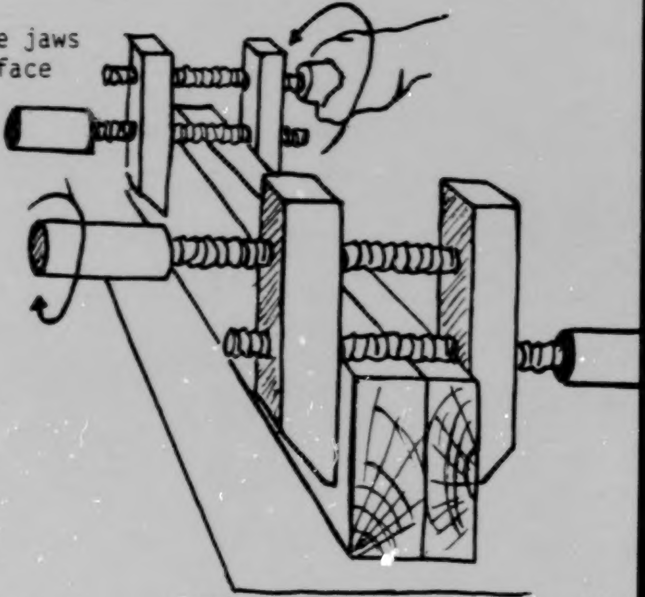


2. Put the hand screws in position on the stock and adjust the outside screw until the distance between the jaws is less than the thickness of the pieces being clamped.

3. Tighten the screw nearest the stock until the jaws are clamped firmly.



4. Adjust the outside screw until the jaws of the clamp are parallel to the face of the stock.



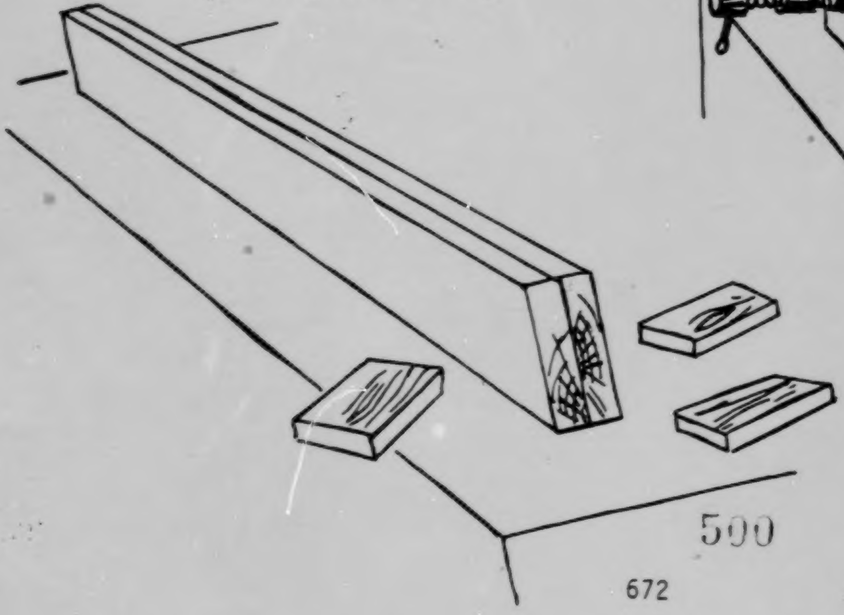
5. Tighten both screws until the pieces of stock are held together tightly along the whole length of the jaws.

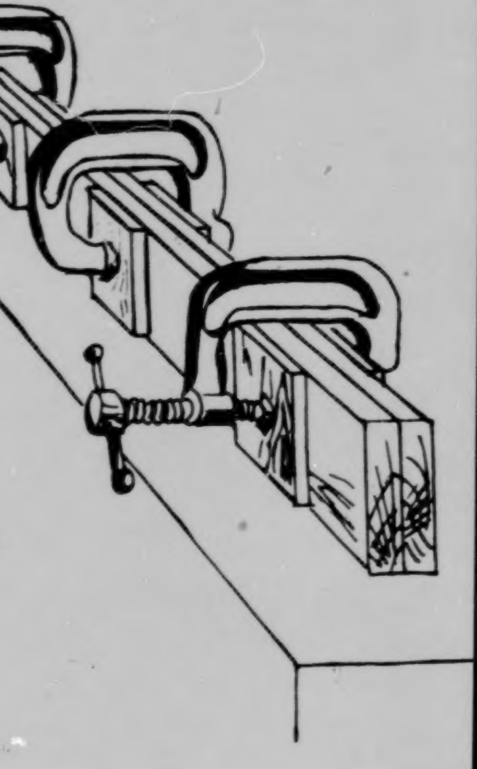
TO CLAMP NARROW STOCK -- UP TO 6" WIDE -- FACE TO FACE WITH C-CLAMPS:

1. Cut pieces of scrap lumber (3/4" thick or thicker) into lengths equal to the width of the stock to be clamped.

2. Place the pieces to be clamped in position on a table.

NOTE: Stock which is wider tha the length of the hand screw jaws can be clamped by using extra clamps along the opposite edge. These would be placed between the clamps used on the first edge.



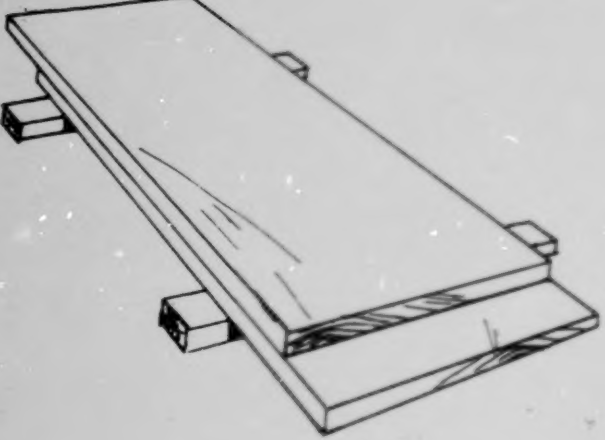


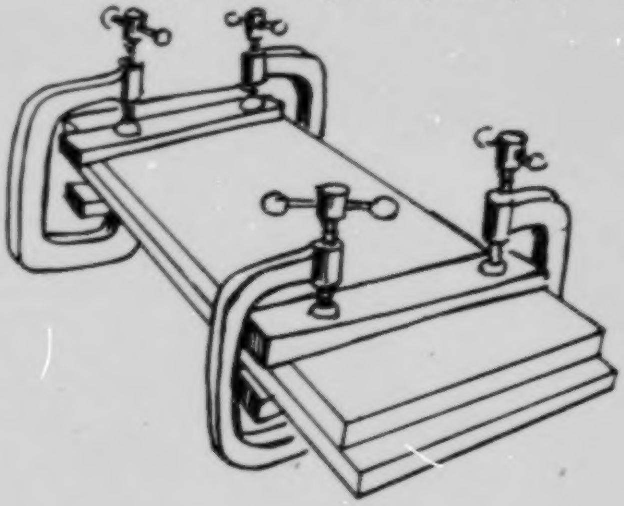
COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

3. Put the scrap pieces in place and adjust the C-clamp to the total thickness of stock plus the scrap pieces.

4. Center the clamp on the stock and tighten the screw.

NOTE: Thin stock will need more clamps. Stock less than ½" thick may need to be clamped every 6" to 8". 2" material may need clamped only every 16".





TO CLAMP WIDE STOCK FACE TO FACE:

1. Cut pieces of 2" X 4" a little longer than the stock is wide.

2. Place the pieces of 2" X 4" on both sides of the pieces being clamped.

3. Clamp the ends of the 2" X 4"'s with either C-clamps or bar clamps.

NOTE: This procedure can also be used to hold lumber flat while it is being clamped edge to edge.

METHOD OF EVALUATION:

Operation will be checked for procedure and accuracy.

OPERATION SHEET
SC-2-16

COMPETENCY: Lay Out a 45° Angle

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

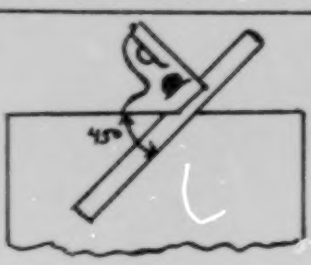
OBJECTIVE: The student will be able to construct angles accurately using a square

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

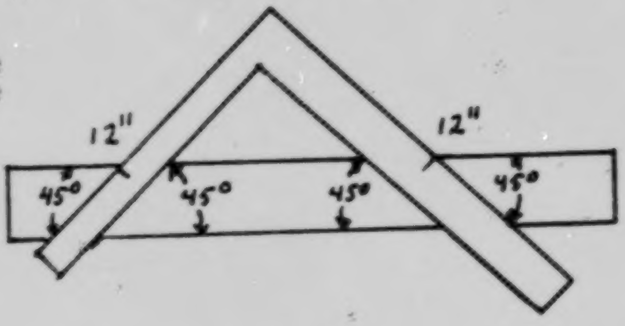
Lay out a 45° angle with a combination square:

1. Place the 45° shoulder against the edge of the board and draw a line along the edge of the blade.



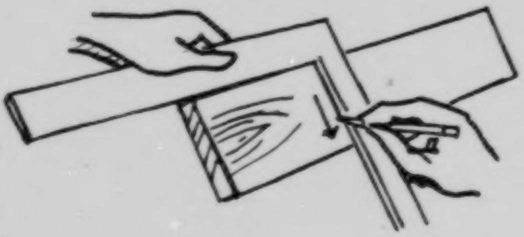
Lay out a 45° angle using the framing square:

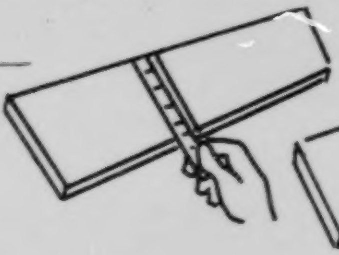
1. Place the square flat on the work piece so that the same measurements along the outside of the tongue and the outside edge of the blade intersect the same edge of the workpiece.
2. Mark along the edge of the square.

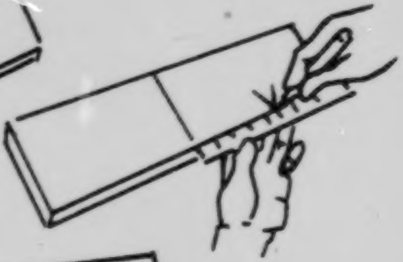


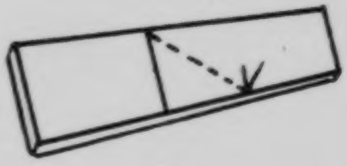
Lay out 45° angle by measuring an equal distance on the sides of a 90° angle and connecting the diagonal.

1. Square a line across the width of the workpiece.
2. Measure along the length of the workpiece a distance equal to the width.
3. Square a line at point marked in Step #2.
4. Connect the diagonals.









METHOD OF EVALUATION:

1. Alignment of square
2. Accuracy of measurements

OPERATION SHEET
SC-2-17

COMPETENCY: Cut with A Miter Box

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to cut stock accurately to the correct angle

Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

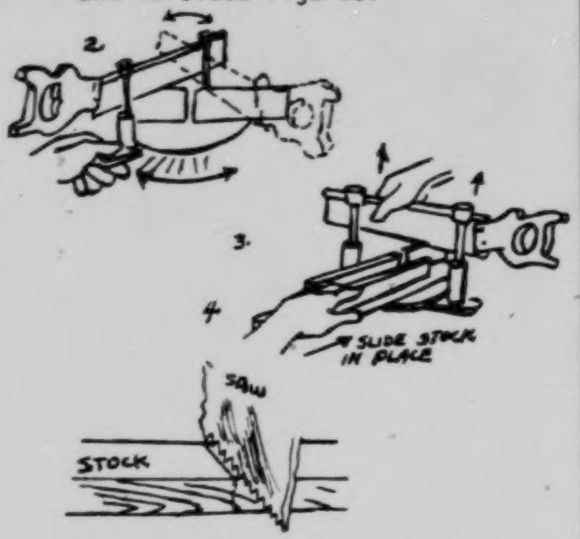
TEACHING/LEARNING ACTIVITIES

---

1. Clamp the miter box to a workbench or sawhorse.

2. Squeeze the index clamping lever between thumb and index finger and slide the saw around to the angle wanted.

NOTE: There are stops on the miter box for all of the standard miter cuts--for 3, 4, 5, 6, 8, and 12 sided figures.



3. Hold the back of the saw and lift it high enough that it clears the stock. Slide the stock in place.

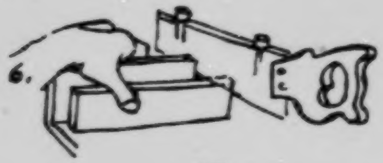
4. Place the material on the table against the back of the miter box. Lower the saw until it is just above the stock.

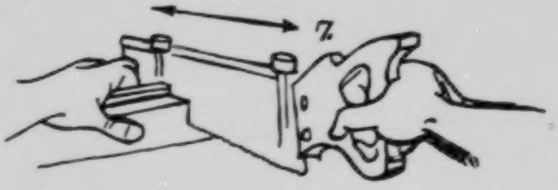
5. Move the stock until the saw is in position so the saw kerf will be beside (on the waste side) the cutting line. Lower the saw until it touches the stock.

6. Hold the stock firmly in place against the back of the box. Grasp the handle of the saw. Raise the saw until the teeth clear the stock.

7. Push and pull the saw while letting the saw settle slowly onto the surface of the material.

NOTE: If you let the full weight of the saw rest on the stock when you start to cut, the saw would take too big a bite and the wood fibers would be torn instead of being cut. This does not usually result in a good fit.





COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
8. Keep cutting with a smooth, steady motion until the stock is cut through.	NOTE: The ends of long pieces must be supported. This makes it easier to hold. It also keeps the stock from splintering or splitting as the cut is completed.

METHOD OF EVALUATION:

1. Correct adjustments
2. Sawing technique
3. Accuracy of cut
4. Appearance of work

OPERATION SHEET
SC-2-18

COMPETENCY: Lay Out Circles and Arcs

COURSE: Carpentry

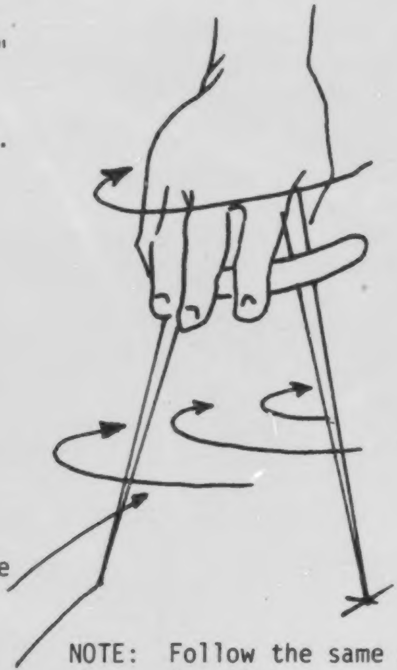
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to obtain skill in laying out circles and other curved lines

Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Set the dividers and holding them in one hand, place the point of one leg on the 1" mark of the rule. Adjust the other leg of the dividers until it rests on the mark equal to the radius you need plus 1".

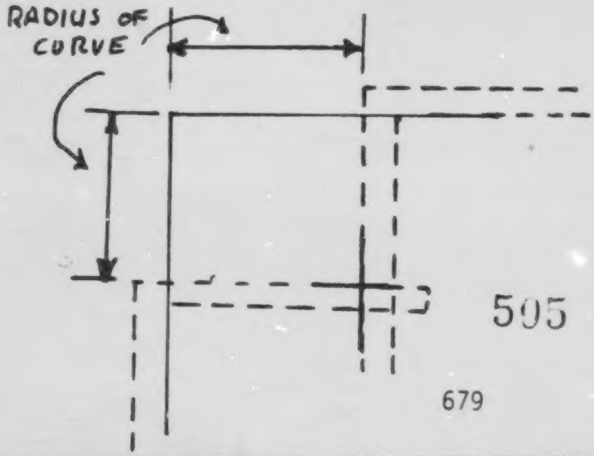


2. To mark the arc or circle, holding the dividers or compass between fingers and thumb.
3. Place the point of one leg on the center mark. Press on it hard enough to hold the point in place.
4. Swing the other leg clockwise, and push down on it to scribe or mark the arc or circle.

NOTE: Follow the same procedure when using the compass.

LAY OUT A ROUNDED CORNER:

1. Measure along edge of stock a distance equal to the radius of the curve.

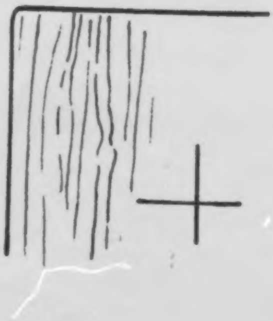


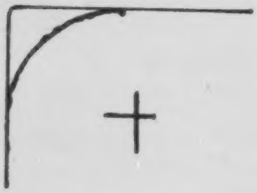
COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

2. Square a line across face of stock at this point.

3. Repeat steps 1 and 2 on the adjacent edge. This will establish a point of intersection

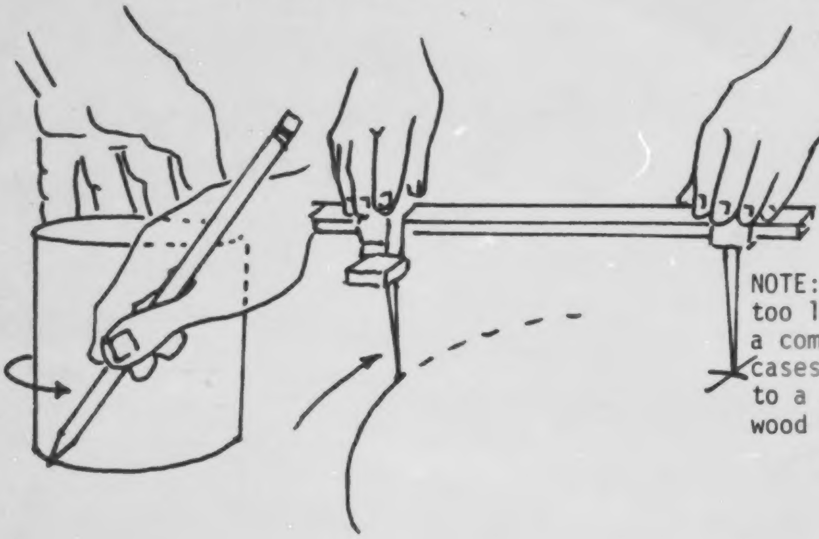




4. Set compass to match radius of curve.

5. Set point of compass on point of intersection and scribe curve.

NOTE: Curve should intersect both edges of the stock.



NOTE: Many circles and arcs are too large to be laid out with a compass or divider. In these cases, trammel points attached to a beam or to a long piece of wood such as a 1 X 2 may be used.

NOTE: Glasses, cups, paint cans, cooking utensils and jars are not considered tools, but they may be used to layout circles or curves. Thin rippings may also be used to layout long gradual curves.

METHOD OF EVALUATION:

Work will be checked for accuracy.

OPERATION SHEET
SC-2-19

COMPETENCY: Cut Curves with a Compass Saw

COURSE: Carpentry

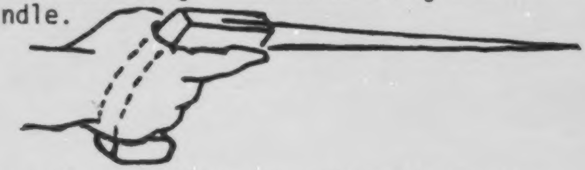
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to properly make a curved cut without splitting the wood or breaking the saw blade

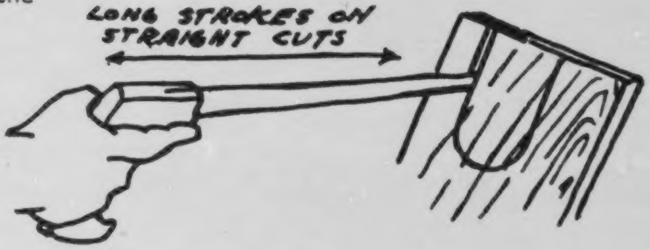
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Hold the saw as you do other hand saws--with index finger extended along the handle.



2. Hold the saw blade perpendicular to the work.

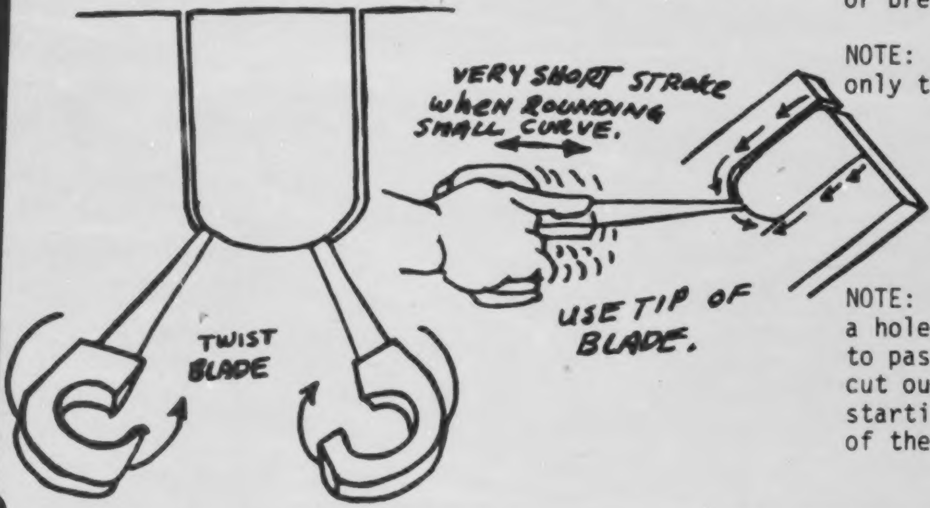


3. Saw with short, choppy strokes.

4. To follow a curved line, slightly in the direction of the curve.

NOTE: Don't force the saw. Forcing could make it buckle or break.

NOTE: For small curves, use only the tip of the blade.



NOTE: To make an inside cut, drill a hole big enough for the saw blade to pass through in the area to be cut out. Use the hole as a starting point to cut out the rest of the pattern.

METHOD OF EVALUATION:

Work will be checked for accuracy and correct use of tool.

OPERATION SHEET
SC-2-20

COMPETENCY: Cut Curves with the Coping Saw

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

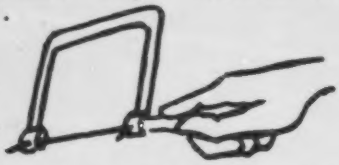
OBJECTIVE: The student will be able to lay out and accurately cut curved meeting specifications

Page 1 of 1 page

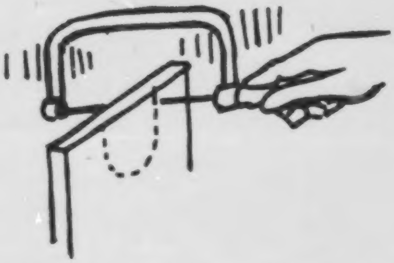
COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

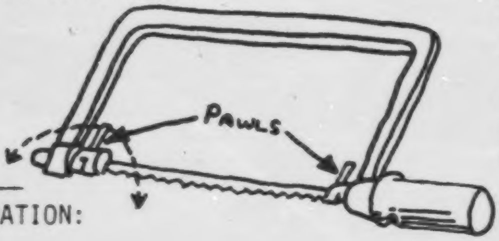
1. Hold material on a firm base (clamp if necessary).
2. Insert blade with teeth pointing forward.
3. Hold handle of saw in palm of hand with thumb and index finger extended along the handle.



4. Hold the saw in a vertical position square with the face.
5. Saw with short, choppy strokes, moving the rear of the saw frame in order to follow the line.



6. If necessary, turn the pawls to allow the cut to be made.



NOTE: To adjust pawls for easier cutting, loosen handle slightly, rotate both pawls to desired position, retighten handle.

NOTE: Small pieces of material should be clamped to prevent movement.

METHOD OF EVALUATION:
1. Layout
2. Cutting accuracy
3. Appearance of cuts

OPERATION SHEET
SC-2-21

COMPETENCY: Use a Sabre Saw

COURSE: Carpentry

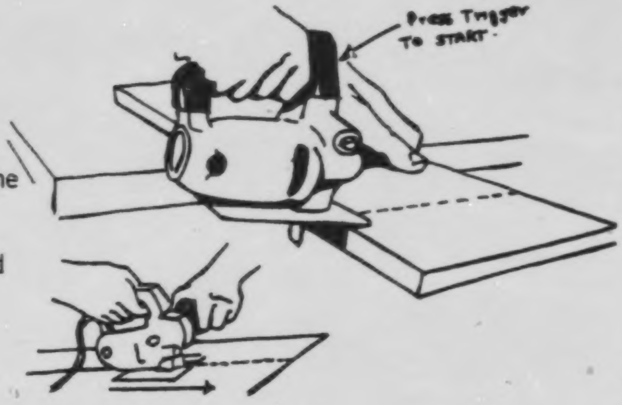
UNIT II: Hand and Machine Tool Processes

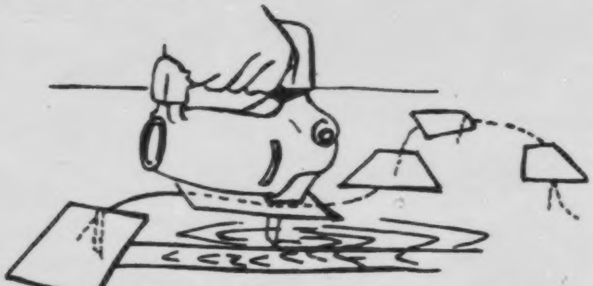
OBJECTIVE: The student will be able to cut stock accurately with a sabre saw

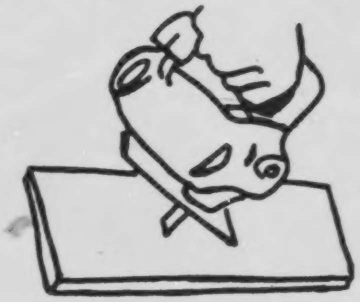
Page 1 of 2 pages

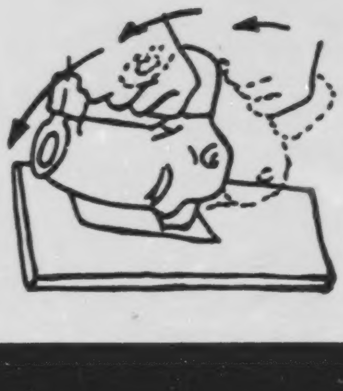
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Select and install proper blade.
2. Place workpiece on bench or sawhorses.
3. Plug in the saw.
4. Place the saw on top of the work with the blade near the starting point.
5. Turn on the saw and move the saw forward into the work.
6. Watch the cutting line just forward of where the blade is cutting.
7. Guide the saw by moving the rear of the saw left or right.
8. Feed the saw into the work very slowly when making sharp curves.
9. When making a square cutout, make the first cut straight into the corner, back up a short distance and cut around the corner. Then square up the corner by shaving in the opposite direction.
10. To cut out in the middle of a piece of stock, tip the saw forward on the front part of the base. The tip of the blade at this point should fall somewhere within the cutout.
11. Turn on the saw by lowering the rear of the saw slowly, allowing the blade to cut through the material.









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COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
12. When the blade has penetrated the work completely, place the base flat on the stock and finish the cut.	
13. Turn off the switch and allow the motor to come to a stop before removing the saw from the work.	NOTE: Lay the saw on its side when not in use.

METHOD OF EVALUATION:

1. Blade selection
2. Cutting procedure
3. Appearance of cut

OPERATION SHEET
SC-2-22

COMPETENCY: Shape Stock with a Wood Rasp

COURSE: Carpentry

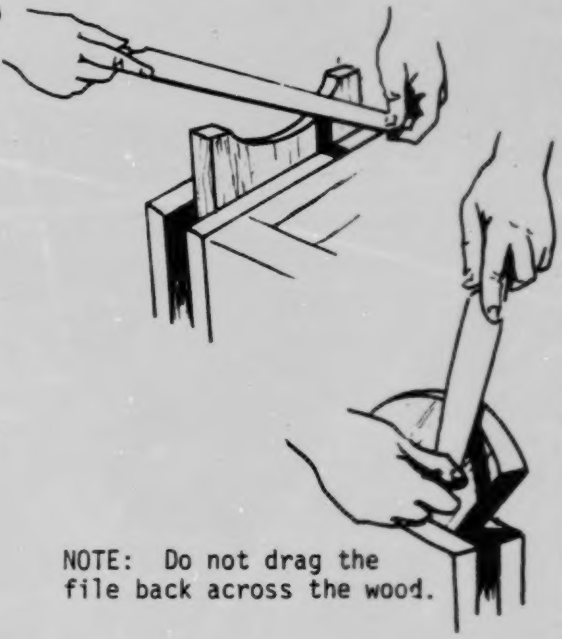
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to rough shape surfaces where space or shape does not permit the use of sharp edged tools

Page 1 of 1 page

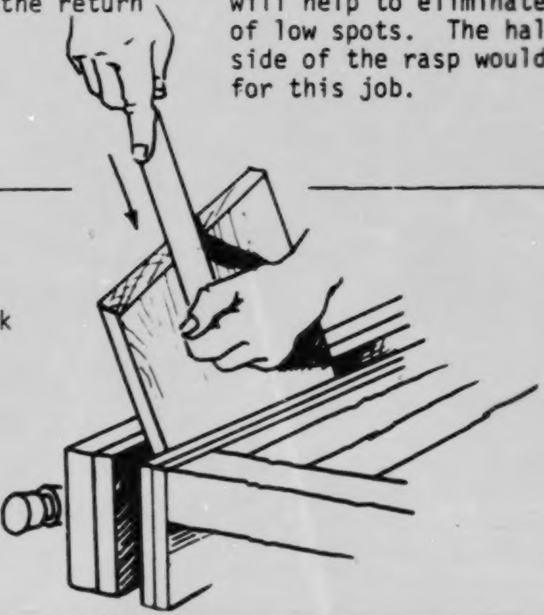
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Select the size and shape of file or rasp best suited to the surface of the work.
2. Clamp the work so it is about as high as the worker's elbow.
3. Stand in a comfortable position, one foot slightly forward.
4. Hold the handle of the file in one hand with out on top of the file. Hold the point of the file with the thumb and first two fingers of
5. File end grain or convex-curved surfaces with forward strokes diagonally across the grain.
6. Lift the file and move it back to make the next stroke.
7. File concave surfaces by holding the file straight across the work and filing as before. File only on the forward motion and lift the file slightly on the return stroke.



NOTE: Do not drag the file back across the wood.

NOTE: When filing concave surfaces, moving the file or rasp sideways on the forward stroke will help to eliminate the filing of low spots. The half round side of the rasp would be used for this job.



METHOD OF EVALUATION:

1. Tool selection
2. Direction of rasping
3. Appearance of finished work

OPERATION SHEET
SC-2-23

COMPETENCY: Rip with the Table Saw

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

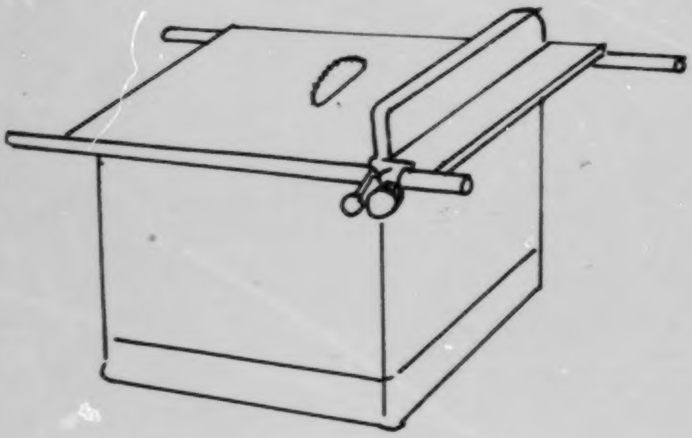
OBJECTIVE: The student will be able to use the circular saw correctly

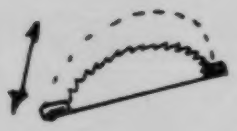
Page 1 of 2 pages

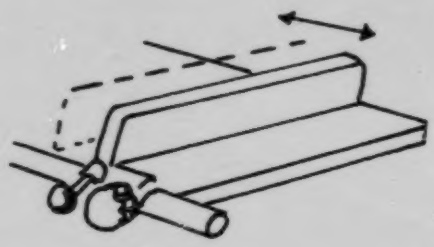
COMPETENCE - PROCEDURE/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

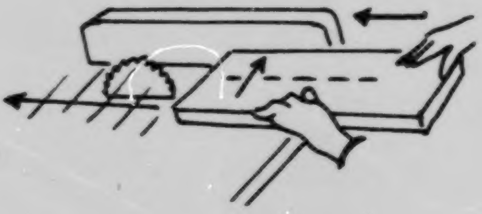
1. Install a rip or combination blade.
2. Adjust the saw blade to proper height for the material being cut (1/8" - 1/4" above the material).
3. Set the rip fence to the required width.
4. Stand to one side of the line of cut (usually to the left) and start the saw.
5. Hold the straight edge of the board against the fence and push the board forward with an even firm motion to make the cut.
6. If necessary, finish the cut with a "push stick".
7. When the cut is complete, turn off the switch and allow the machine to stop before leaving it.







CAUTION: Maintain a 4" margin of safety.



NOTE: Do not operate the table saw without the blade guard in place. The guard is removed in the drawings only to clarify the steps involved.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

METHOD OF EVALUATION:

1. Equipment alignment and setup
2. Safety technique
3. Accuracy of cut

OPERATION SHEET
SC-2-24

COMPETENCY: Plane Edge of Stock with the Jointer

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to smooth and straighten the edge of stock on a jointer

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Adjust the fence so it is square with the table.	
2. Set the depth adjustment for a fine cut (1/16").	NOTE: Be certain all guards are in position and operating properly.
3. Stand in a comfortable position, left foot forward, slightly in back of the cutting head.	NOTE: Keep your hands away from the cutterhead. Always maintain a 4" margin of safety. When possible, the thumb and index finger of the left hand should remain on the top edge of the work.
4. Place the front edge of the stock on the infeed table with the working face against the fence.	
5. Turn on the machine.	
6. Feed the stock over the cutter in a slow, even motion. The left hand is used to hold the stock onto the table and against the fence. The right hand is used to feed the material across the cutterhead.	NOTE: On narrow stock, or when surfacing a piece of stock, a push stick is used to push the end of the piece across the cutter.
7. Move the left hand into position over the outfeed table as soon as there is sufficient material to hold on to. When nearing the end of the cut, both hands should be moved over the outfeed table.	
8. When the cut is complete, turn off the swich and allow the machine to stop before leaving.	

METHOD OF EVALUATION:

1. Safety precautions
2. Equipment adjustments
3. Cutting procedure
4. Appearance of work

OPERATION SHEET
SC-2-25

COMPETENCY: Crosscut with Radial Arm Saw

COURSE: Carpentry

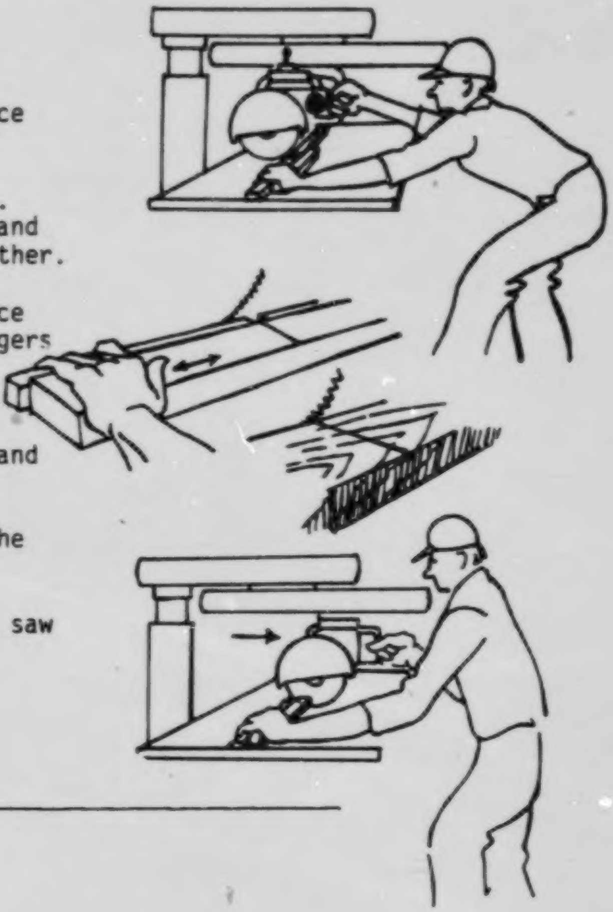
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to cut stock accurately with a power saw

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Set the over arm to zero.
2. Set the saw blade to cut slightly below the surface of the table.
3. Mark the stock where it is to be cut.
4. Place the piece against the guide fence with the larger piece to the left.
5. Move the saw to the rear of the table. Hold the handle of the saw with one hand while turning on the power with the other.
6. Hold the stock firmly against the fence with the left hand by placing the fingers on top of the piece and thumb hooked over the front edge.
7. Grasp the handle with the right hand and pull the saw forward to make the cut.
8. After the cut has been made, return the saw to the rear of the table.
9. Shut off the power and stay until the saw stops completely.



METHOD OF EVALUATION:

1. Safety precautions
2. Adjustment of saw
3. Sawing procedure
4. Accuracy of cut

OPERATION SHEET
SC-2-26

COMPETENCY: Make and Use a Pattern

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to make a new pattern

Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

MARK FRAMING MEMBERS USING A PATTERN:

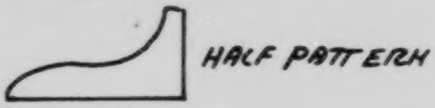
1. Lay off length of pattern and cut it accurately.

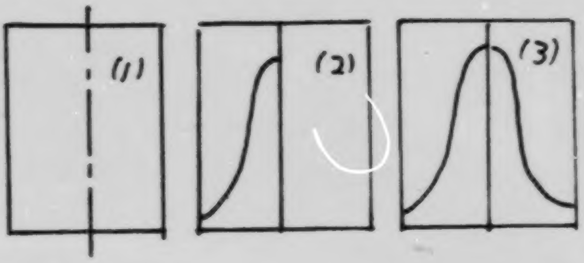
NOTE: The pattern should be clearly identified. Continue to use the one pattern for all pieces to be cut.

2. Double check piece after cutting to be sure it is exactly as needed.
3. Lay pattern on material to be cut, being sure it is aligned properly at end and edges.
4. Use a sharp pencil and mark as close to the pattern as possible.
5. Cut second piece, removing the pencil line with the saw kerf.
6. Cut any number of additional pieces.

USE A HALF PATTERN:

1. Lay off center line along length of stock.
2. Place edge of pattern on center line and trace cutting line.
3. Turn the pattern over and repeat procedure for opposite side. Be careful to align top and bottom marks when marking the second half.





HALF PATTERN

MAKE A PATTERN USING THE GRID SYSTEM:

1. Use a prepared sketch or make a drawing of the object to scale.
2. Draw horizontal and vertical grid lines on the drawing. The space between the lines should represent one inch.

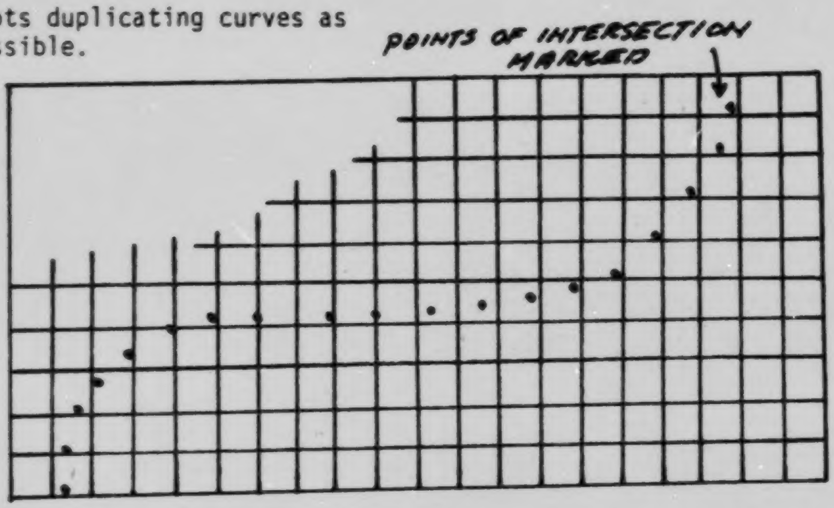
NOTE: One vertical line should run through the center of the drawing and all other vertical lines should be drawn in relation to it.

3. Mark each horizontal and vertical line at the point where it is intersected by the line of the object.

4. Lay off horizontal and vertical grid lines on material at one inch intervals.

5. Transfer dots (intersection points) from the sketch or drawing to the material.

6. Connect all dots duplicating curves as closely as possible.



METHOD OF EVALUATION:

1. Drawing interpretation
2. Measuring accuracy
3. Stock layout

OPERATION SHEET
SC-2-27

COMPETENCY: Drive Nails with a Claw Hammer

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to become an expert at driving nails

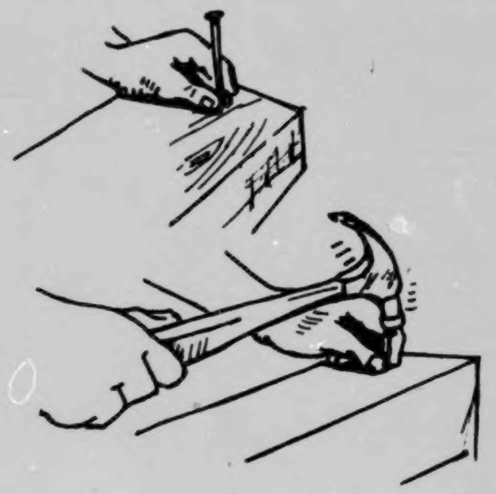
Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

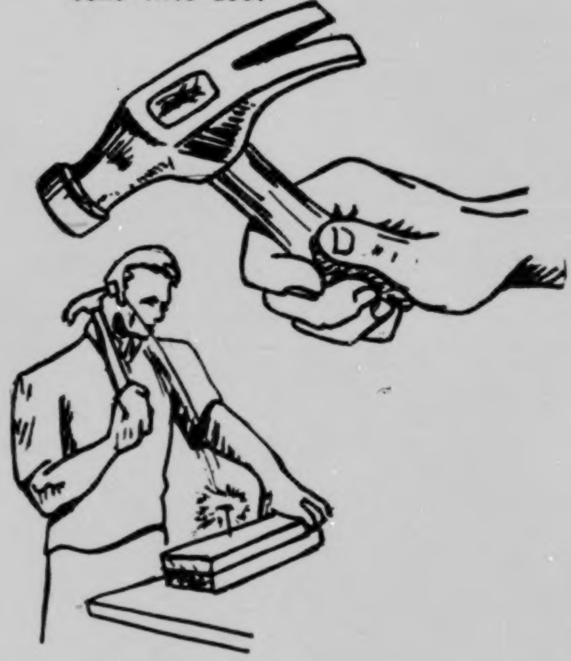
TEACHING/LEARNING ACTIVITIES

DRIVE NAILS:

1. Hold the hammer handle with fingers underneath and thumb beside or on top of the handle. Except for light blows, the handle is held close to the end.
2. Hold the nail between the fingers of other hand. Use the rest of the hand to help position the nail.
3. Rest the face of the hammer on the head of the nail. Raise the hammer slightly and give the nail a light tap or two. This starts the nail and will help to set the aim of the hammer.
4. Line the hammer up so that the nail is struck squarely. This will keep you from bending the nail or marring the wood.
5. As the hammer is raised, bend the elbow and cock the wrist upward and on the downward swing, straighten the elbow and snap the wrist downward just before the hammer strikes the nail.
6. Keep the hammer handle perpendicular to the path of the nail.
7. Drive the nail with sharp, crisp blows, until the head is almost level with the surface.



NOTE: Most nails are driven using only the wrist and the elbow. Only when driving large nails or spikes does the shoulder come into use.



COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
8. Finish driving the nail with light blows so as not to damage the surface of the wood.	NOTE: DO NOT: 1. Strike a nail with the cheek of the hammer, as it is the weakest part. 2. Damage the face by striking steel harder than itself. 3. Try to pull large nails with a hammer. Use a pinch bar. 4. Hold the hammer handle in the middle except to drive small nails or brads.

METHOD OF EVALUATION:

1. Hammer grip
2. Manipulative movements
3. Absence of errors

OPERATION SHEET
SC-2-27A

COMPETENCY: Pull Nails with the Claw Hammer

COURSE: Carpentry

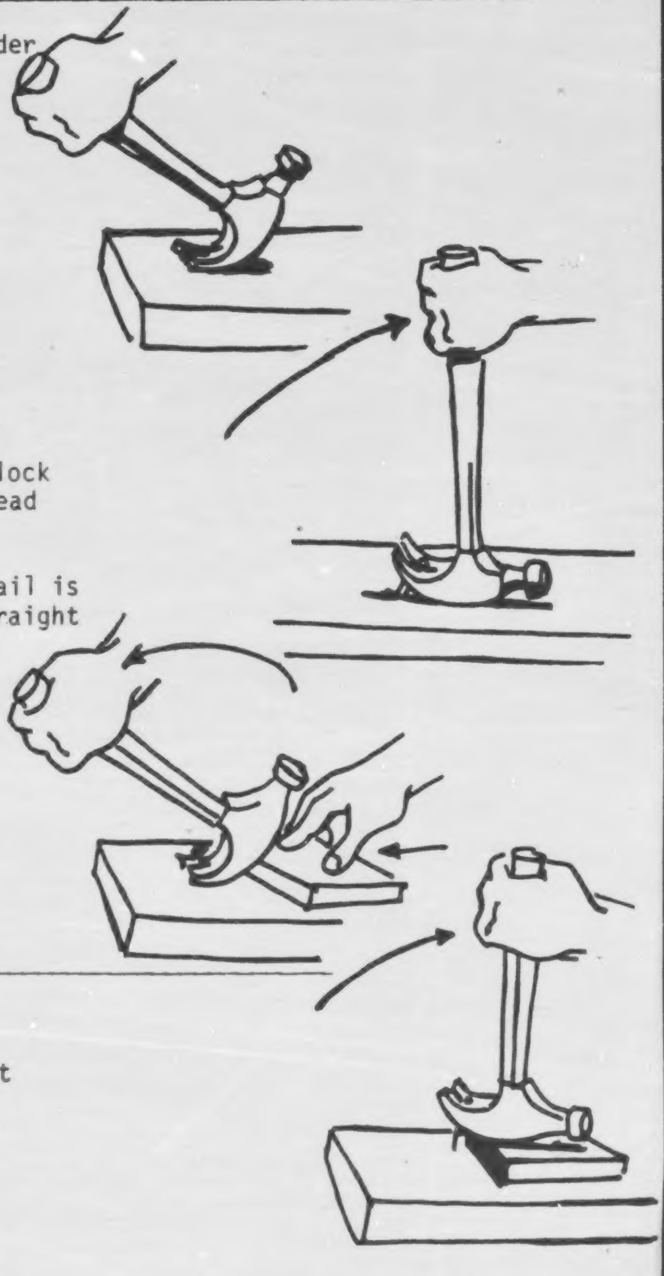
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to properly use the claw hammer to pull nails

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Set the claw of the hammer firmly under the head of the nail.
2. Pull the hammer handle until it is almost straight up.
3. Tip the hammer handle forward so a block of scrap wood can be put under the head of the hammer.
4. Draw upon the nail again until the nail is free or until the handle is again straight up.
5. If the nail is not out, add a second block of wood and repeat step 4.



METHOD OF EVALUATION:

Operation will be checked for correct procedure and safety.

OPERATION SHEET
SC-2-27B

COMPETENCY: Pull Headless Nails with a Claw Hammer

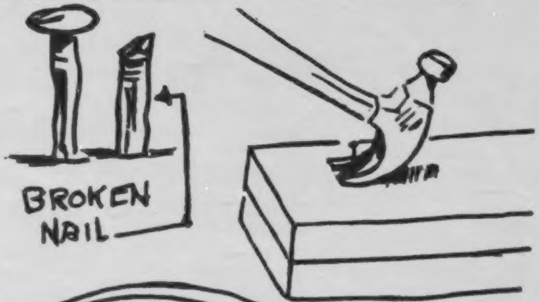
COURSE: Carpentry

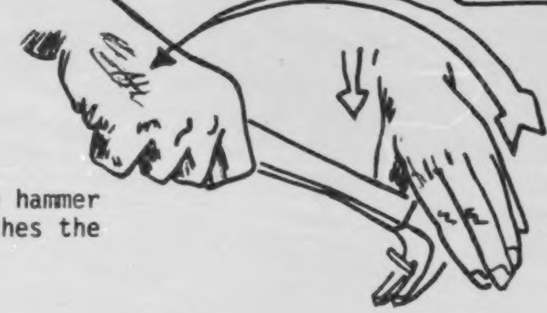
UNIT II: Hand and Machine Tool Processes

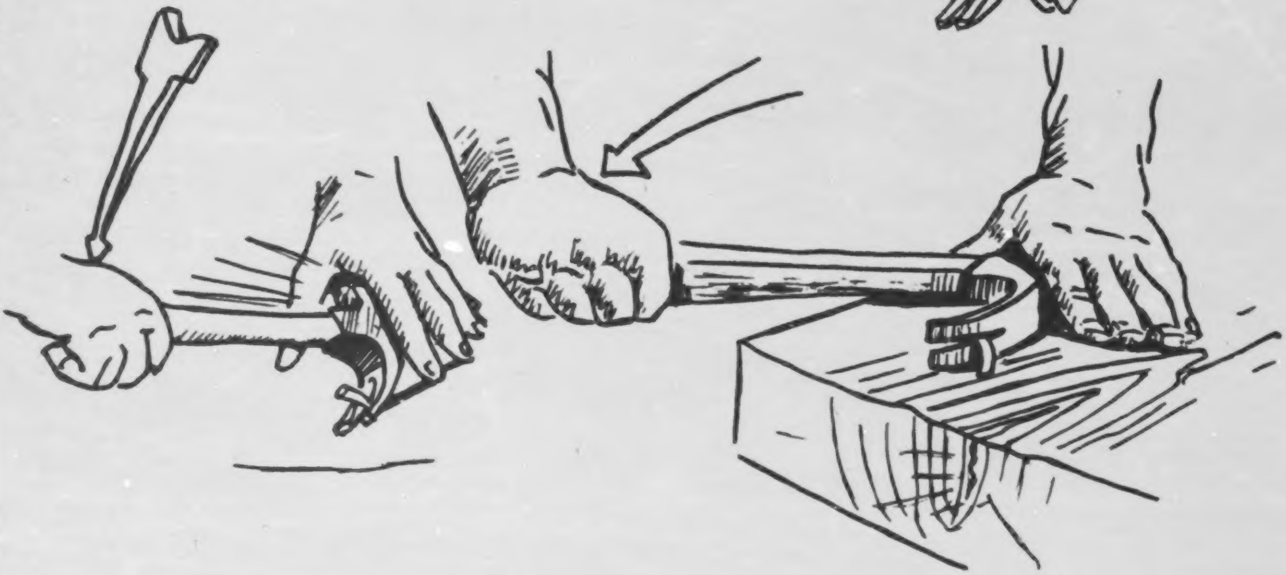
OBJECTIVE: The student will be able to master the proper technique for pulling headless nails

Page 1 of 2 pages

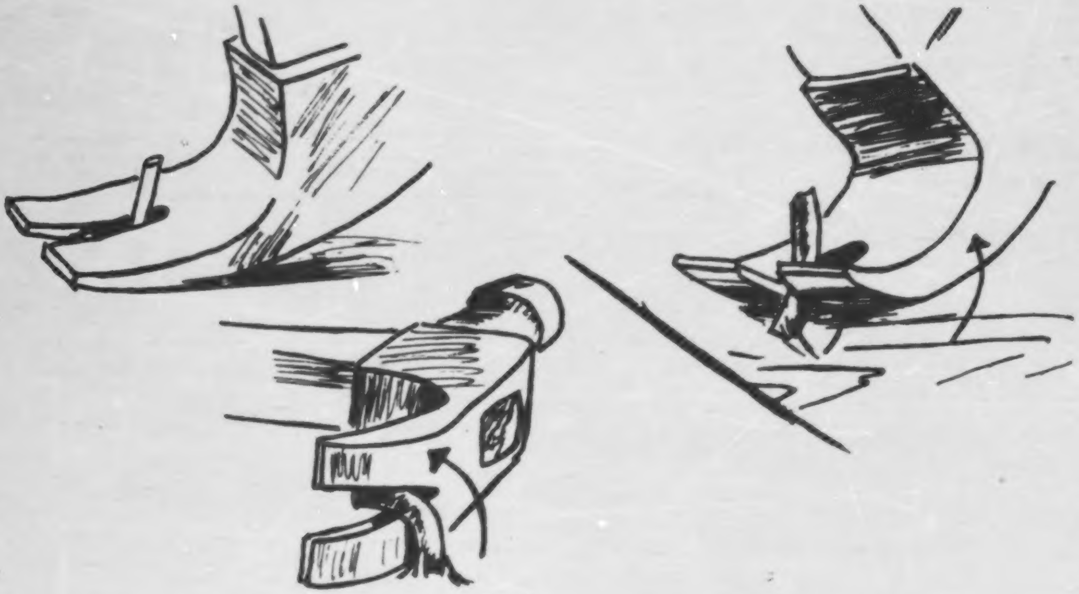
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place the hammer claws in position on the nail.	
2. Apply firm forward pressure to the hammer head with one hand.	
3. With the other hand, pull the hammer sideways until your hand touches the stock.	







COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
4. Repeat steps 1, 2, and 3 until the nail is out.	



METHOD OF EVALUATION:

Operation will be checked for correct procedure and safety.

OPERATION SHEET
SC-2-27C

COMPETENCY: Pull Nails with a Nail Puller

COURSE: Carpentry

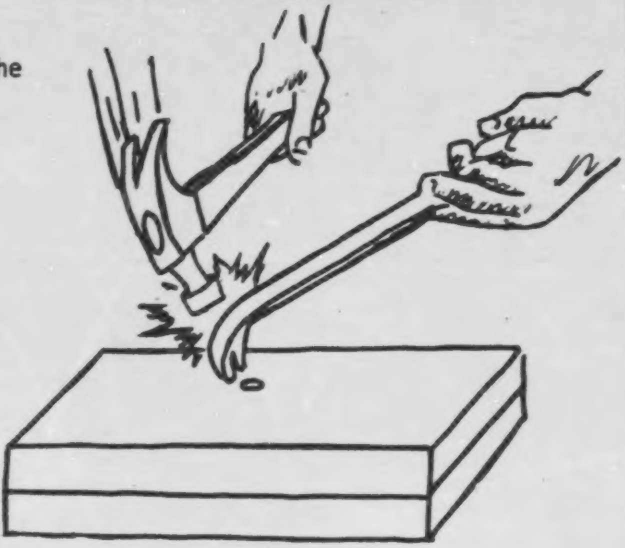
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to properly use the nail puller to pull nails

Page 1 of 2 pages

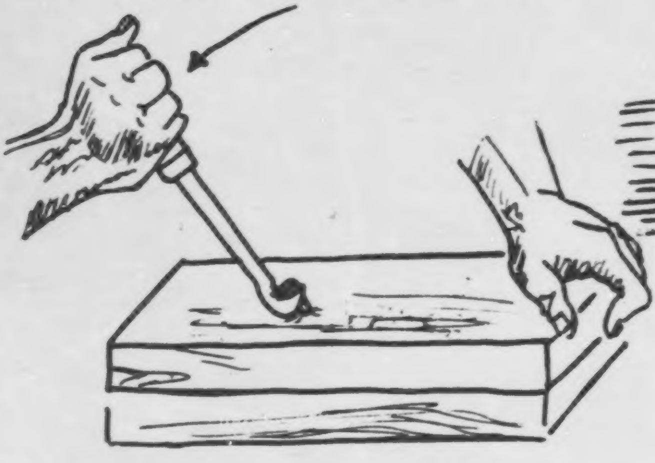
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

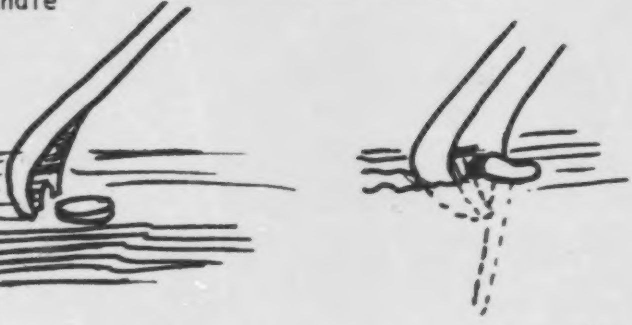
1. Drive the nail puller into the wood so that the head of the nail is between the claws.



2. Drive the claws under the head of the nail while bringing the handle of the puller into line with the nail.

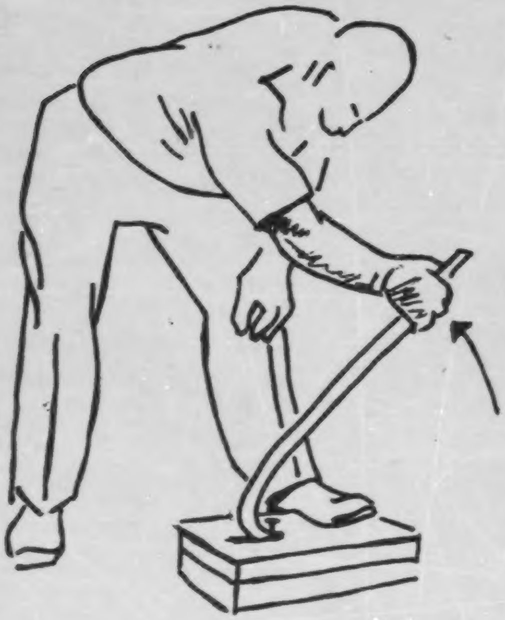
3. When the claws are firmly seated under the nail head, pull back on the handle and begin to remove the nail.

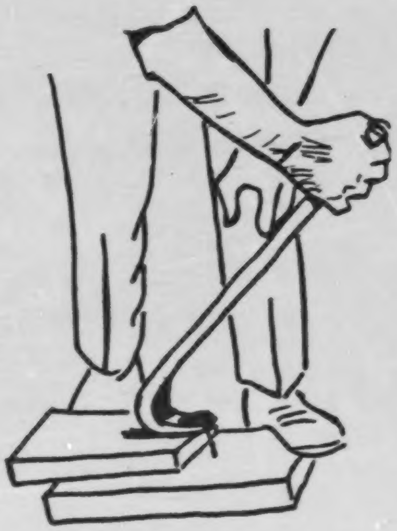




COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

4. Remove the rest of the nail with a hammer or a pinch bar.





METHOD OF EVALUATION:

Correct procedure and safety.

OPERATION SHEET
SC-2-28

COMPETENCY: Whet an Edge on a Plane Iron and Wood Chisel

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to sharpen tools to a fine edge and to remove the wire edge after grinding or to restore a sharp edge

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

TEACHING/LEARNING ACTIVITIES

---

1. Select a combination oilstone.

2. Place oilstone in holder, course side up. Wipe face of stone, then apply a few drops of light machine oil.

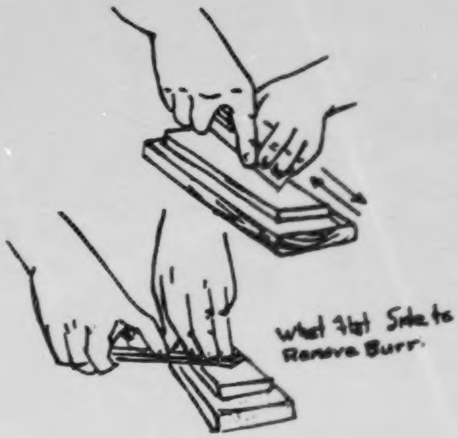
3. Hold the back of the plane iron (the handle of the chisel) in the right hand. Use the left hand with the fingers underneath the tool to help to guide the tool over the stone and to maintain the proper angle.

4. Place the whole bevel in contact with the stone, then raise the back edge slightly to an angle of about 30°.

5. Move the tool back and forth over the stone, using a moderate pressure on the forward stroke and less pressure on the return stroke. Try not to rock the tool.

6. Remove wire edge by taking a few strokes across the face of the stone with the flat side of the blade in contact with the stone. When performing this operation, the blade must be held flat on the stone. Do not bevel this side.

7. Repeat the process on the fine side of the stone until any nicks or indications of bluntness are removed. A sharp edge is invisible. A dull edge will reflect light.



NOTE: Some type of holding device must be used to hold the stone. A specially made wooden box which can be clamped in a bench vise is very useful.

METHOD OF EVALUATION:

1. Preparation of stone
2. Correct blade angle
3. Movement of blade on stone
4. Degree of sharpness

OPERATION SHEET
SC-2-29

COMPETENCY: Grind a Plane Iron or Wood Chisel

COURSE: Carpentry

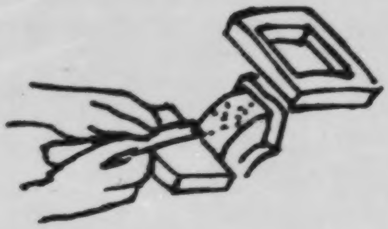
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to reshape the cutting edge of a tool

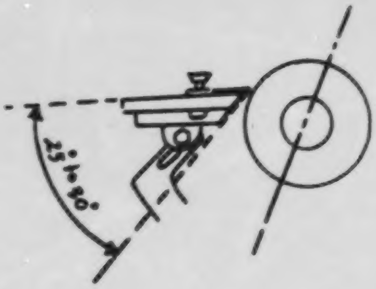
Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Adjust the tool rest slightly below the center of the wheel.
2. Dress the cutting edge so it is square with the sides, and until all nicks are removed. Work the tool across the face of the wheel with light pressure.
3. Adjust the tool rest so that the angle of contact where the wheel meets the tool is about 30°.



4. Work the cutting edge across the wheel while keeping the sides of the tool square with the face of the wheel. Apply only light pressure.
5. Dip the tip of the tool in cold water often to keep it cool.
6. Continue grinding until a hollow bevel is formed and a fine edge is obtained.



METHOD OF EVALUATION:

1. Safety requirements
2. Grinding techniques
3. Accuracy of edge
4. Degree of sharpness

OPERATION SHEET
SC-2-30

COMPETENCY: Cut a Gain with a Wood Chisel

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

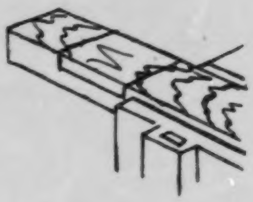
OBJECTIVE: The student will be able to accurately cut a gain with a wood chisel

Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Mark the width and depth of cut.

2. Cut the shoulder of the gain to the required depth with a saw.



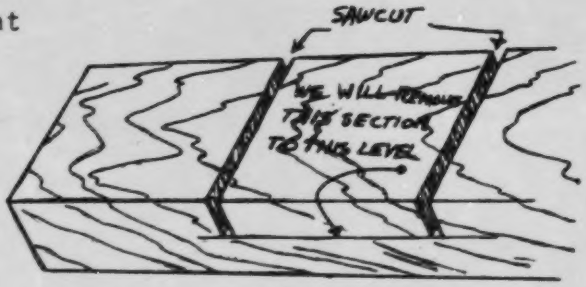
3. Select as wide a chisel as can be used.

4. Starting at one end of the gain, hold the cutting edge of the chisel slightly above the depth mark, bevel side up.

5. Lower the chisel handle slightly so that the cut will be slightly upward.

6. Strike the chisel handle with a mallet to remove the surplus stock. Repeat across entire length of gain.

7. Make a cut from the opposite side of the gain in the same manner.



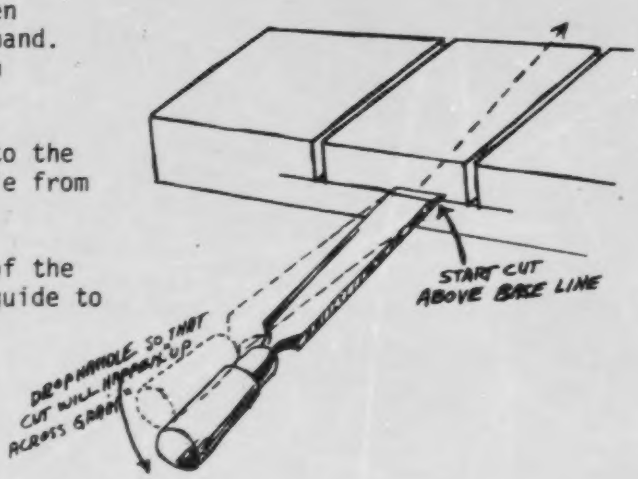
8. Make the final paring cuts with the chisel, flat side down.

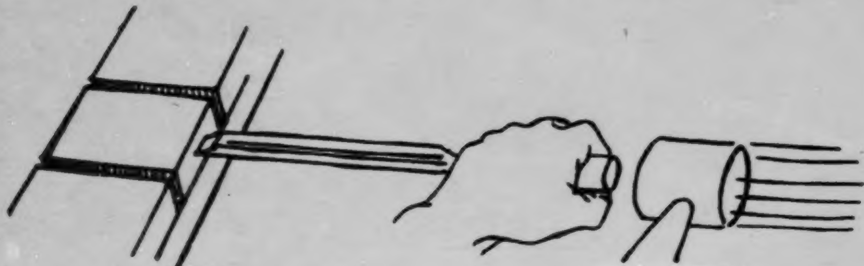
NOTE: Use only the pressure of the right hand to draw the chisel.

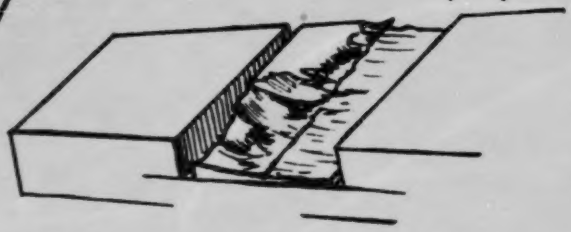
9. Hold the blade of the chisel between the fingers and thumb of the left hand. This will help to control the depth and length of cut.

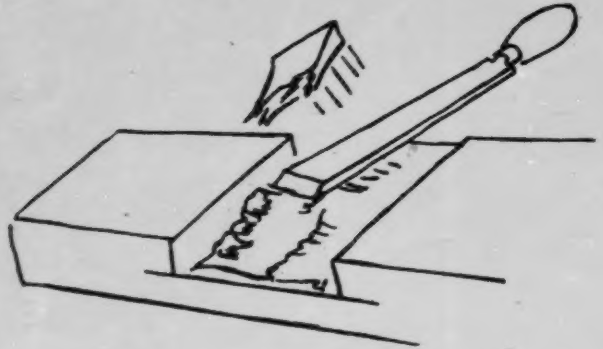
10. Hold the chisel at a slight angle to the direction of cut and work the handle from side to side in a shearing motion.

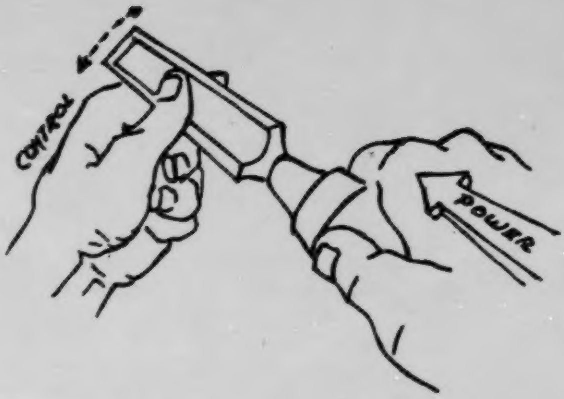
11. Cut with only a part of the width of the chisel and use the remainder as a guide to maintain the depth of cut.

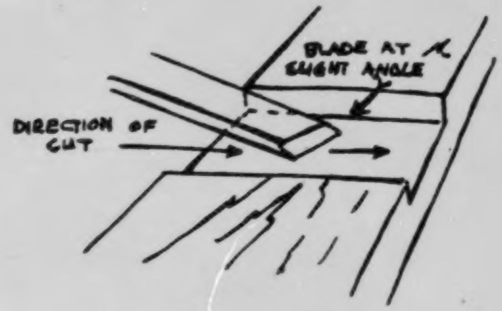

START CUT ABOVE BASE LINE
DROP HANDLE SO THAT CUT WILL HAPPEN UP ACROSS GRAIN








CONTROL
POWER


BLADE AT A SLIGHT ANGLE
DIRECTION OF CUT

METHOD OF EVALUATION:

1. Layout of cut
2. Selection of tools
3. Cutting technique
4. Accuracy of chiseling

OPERATION SHEET
SC-2-31

COMPETENCY: Lay Out Angles with a Framing Square

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to lay out angles on stock in preparation for cutting or assembling

Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

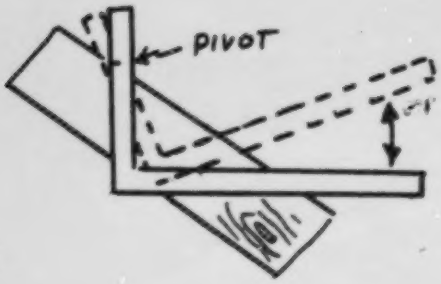
LAY OUT ANGLES WITH THE FRAMING SQUARE USING INFORMATION FROM THE ANGLE TABLE

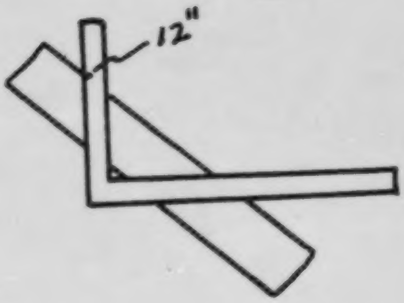
1. Lay the framing square on the board so the 12" mark on the tongue is even with the edge of the board. Use this as a pivot point.

2. From the angle table, find the number to be used on the blade to give the desired angle. For example: For an angle of 60°, use 12" on the tongue and 6 15/16" on the blade.

3. Rotate the blade of the square to bring the graduation which will give the desired angle, even with the edge of the board.

4. Lay out the angle and mark along the tongue.





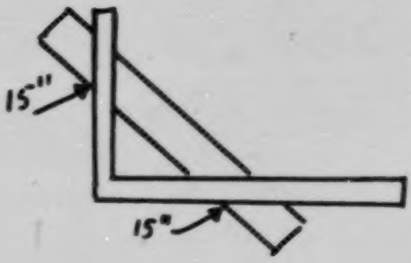
NOTE: To angles given in the table represent an included angle in relation to a vertical line, when the mark is made along the tongue. Marking along the blade will give an angle which is the difference between 90° and the number listed in the table.

NOTE: Many angles are laid out by the carpenter with no thought as to the degrees involved; for instance, when laying out rafters, braces, stair horses, saw horse legs, etc. In these instances, the two legs of the framing square represent the two shorter sides of a right triangle while the rafter, brace, stair horse, trestle leg represent the third side or the hypotenuse. The shorter horizontal side is referred to as the run and the shorter vertical side is called the rise.

LAY OUT THE ANGLE ON THE END OF A BRACE HAVING EQUAL RISE AND RUN

1. Place the square on the piece with equal graduations on the tongue and blade. Marking along one side will give the vertical cut and marking along the other side will give the horizontal cut.

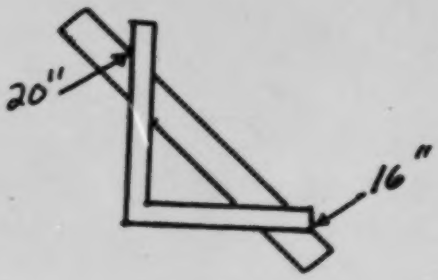
   Example: Run = 11'3" and
   Rise = 1'3"



LAY OUT THE ANGLE ON THE END OF A BRACE HAVING UNEQUAL RISE AND RUN.

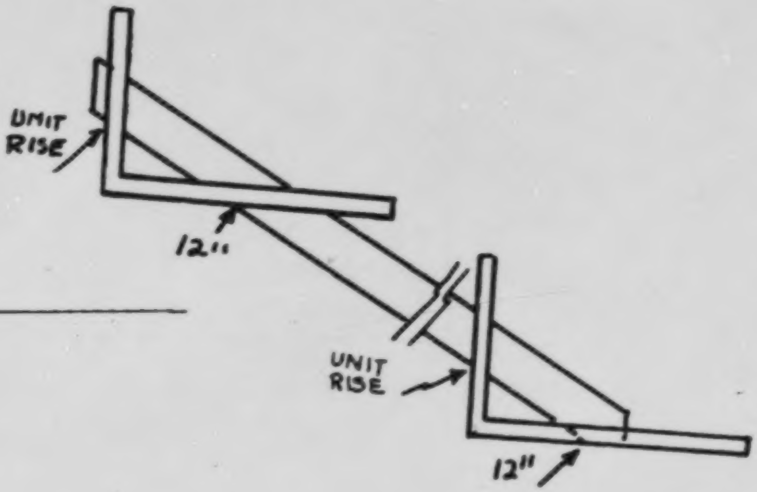
1. Place the square on the piece with the rise on one leg of the square and the run on the other.

   Example: Run = 1'4" and
   Rise = 1'8"



LAY OUT THE ANGLE ON THE END OF A COMMON RAFTER

1. Use the unit rise on the tongue and the unit run on the blade and mark along the tongue for the top or plumb cut. Marking along the blade will give the horizontal or seat cut.



METHOD OF EVALUATION:

1. Use of square
2. Accuracy of layout

OPERATION SHEET
SC-2-32

COMPETENCY: Determine the Length of Braces or Trestle Legs

COURSE: Carpentry

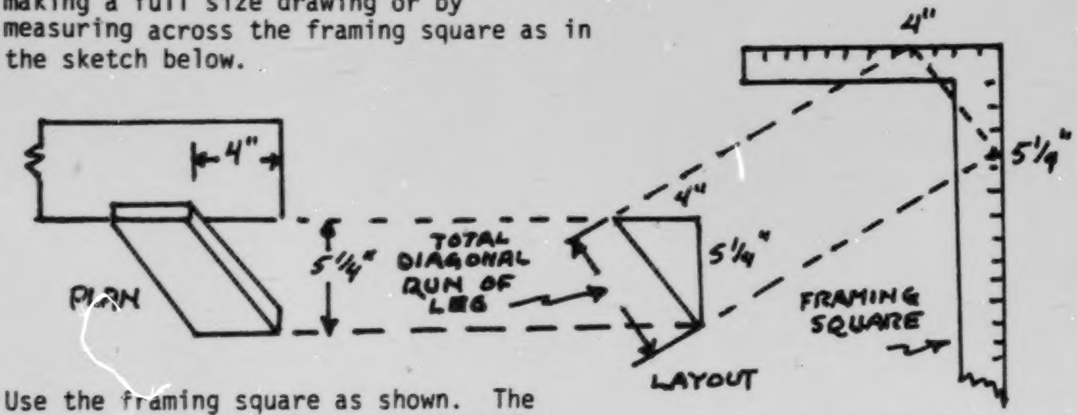
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to properly and accurately measure braces

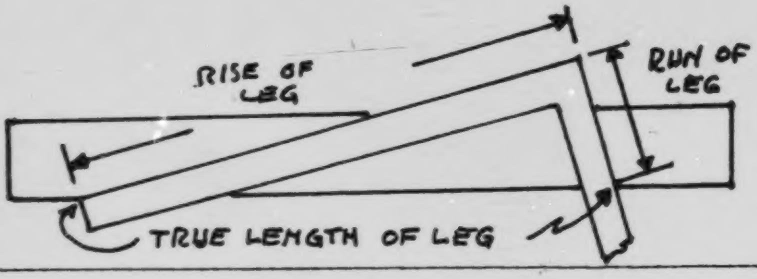
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Find the hypoteneuse of the triangle formed by the pitch of the leg in both directions. This is the total diagonal run of the leg. It may be found by making a full size drawing or by measuring across the framing square as in the sketch below.


4"
PLAN
5¼"
TOTAL DIAGONAL RUN OF LEG
4"
5¼"
LAYOUT
4"
5¼"
FRAMING SQUARE

2. Use the framing square as shown. The rise of the leg should be on the body. The run, found in step 1, should be on the tongue. Mark the length of the leg on the edge of a straight board.


RISE OF LEG
RUN OF LEG
TRUE LENGTH OF LEG

METHOD OF EVALUATION:

1. Correct length
2. Accuracy of angles

OPERATION SHEET
SC-2-33

COMPETENCY: Cut Simple or Compound Miter with a Handsaw

COURSE: Carpentry

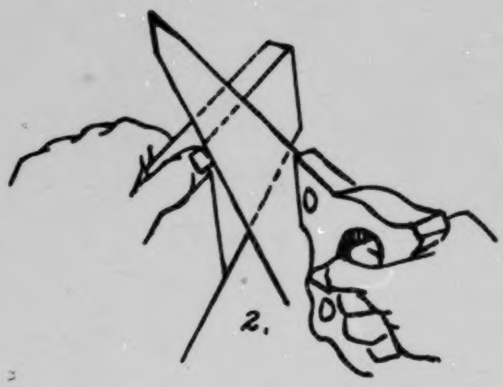
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to cut accurate angles using a handsaw

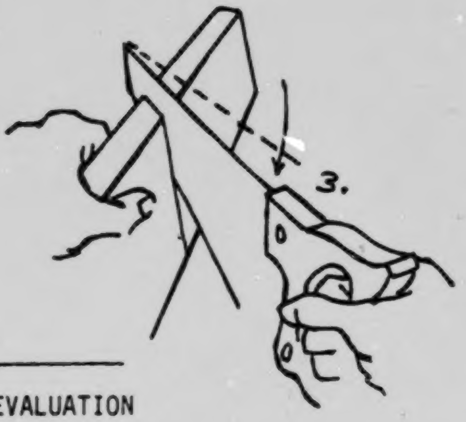
Page 1 of 1 page

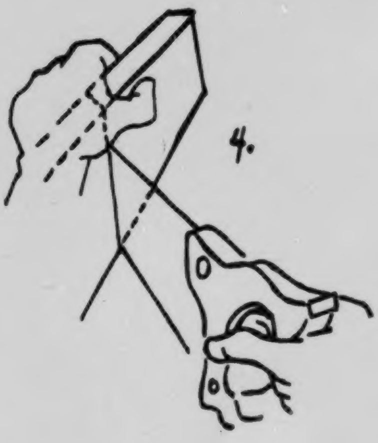
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Clamp the piece to be cut in a bench vise, edge up, so that the mark across the face of the board is in a nearly vertical position.
2. Start the saw along the guide line on the waste side of the line. The first few strokes should be across the entire width of the piece while sighting along both layout lines.
3. After cutting about 1/2" into the piece, lower the handle of the saw slightly below the tip. This will make it easier to follow the line.
4. When nearing the end of the cut, again level the saw and support the waste to prevent splitting.



NOTE: Sawing should be from the face of the board and away from the bench, if possible.





METHOD OF EVALUATION

1. Sawing technique
2. Accuracy of cut
3. Appearance of cut

OPERATION SHEET
SC-2-34

COMPETENCY: Dado, Rabbet and Plow with Radial Saw

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to cut precision dadoes, rabbets and plows with a radial arm saw

Page 1 of 2 pages

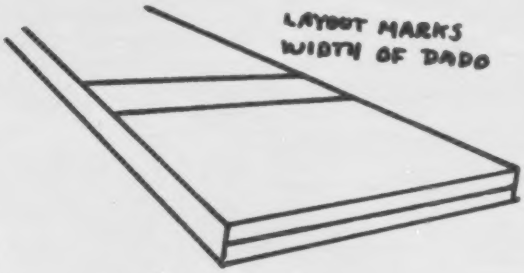
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

CUT DADOES OR END RABBETS:

1. Remove the saw blade and install dado heads of desired width.

NOTE: Saw should be in cross-cutting position.

2. Raise or lower the dado head to the desired depth.
3. Adjust the sawguard to the proper height.
4. Make a test cut on a piece of scrap wood. Make adjustments if necessary.
5. Hold the stock in position against the fence.
6. Start the motor, holding the handle and slowly pulling the saw forward to make the cut.

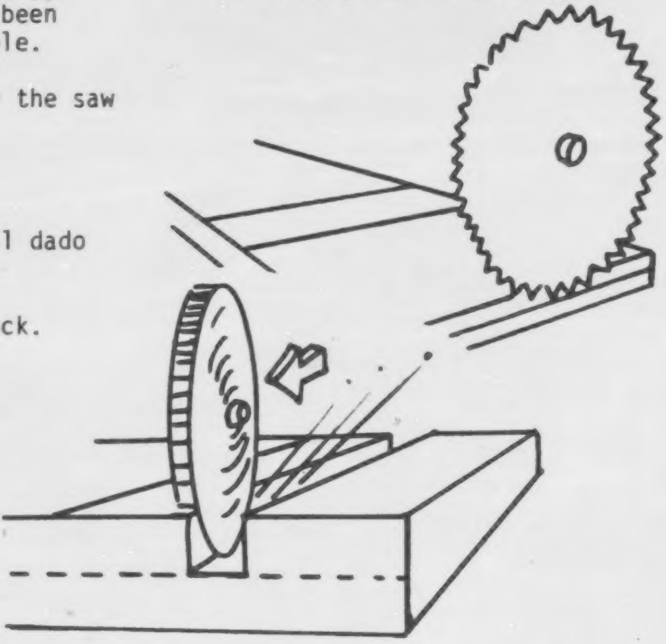


NOTE: Wider dadoes or rabbets may be cut by moving the work and taking additional cuts.

7. Complete the cut; the operation is not complete until the saw has been returned to the rear of the table.
8. Turn off the power and wait for the saw to stop before leaving.

PLOW GROOVES OR RABBET EDGES:

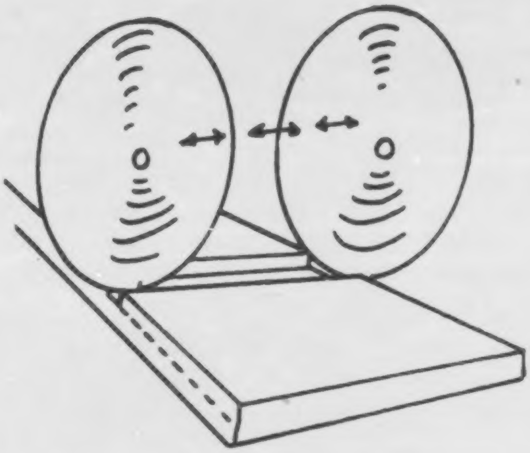
1. Remove the saw blade and install dado head.
2. Turn saw to rip position and lock.



COMPETENCE - PROCEDURES/STEPS

TEACHING/LEARNING ACTIVITIES

3. Set saw to cut groove at desired location.
4. Set saw to proper depth of cut.
5. Adjust the guard and anti-kickback to proper position.
6. Test on a piece of scrap.
7. Place the stock against the fence and feed into dado head, keeping hands clear. Use a push stick to complete cut.
8. Cut wider grooves by repositioning the saw and making additional cuts.



METHOD OF EVALUATION:

1. Adjustment of equipment
2. Sawing technique
3. Accuracy of cut

OPERATION SHEET
SC-2-35

COMPETENCY: Shape Edges of Stock with a Router

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to edge stock accurately with a router

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Install proper bit in router motor.	
2. Adjust the router base to the desired depth of cut.	
3. Adjust the edge cutting guide so the bit is cutting to the proper width.	NOTE: It is always a good idea to try the cut on a piece of scrap.
4. Clamp the stock securely.	
5. Connect the router to the power source.	
6. Place the router base on the stock so the bit is almost touching the stock.	NOTE: Some cutter bits are provided with a pilot to limit the width of cut. When using these bits, no edge guide is necessary. However, do not apply very much side pressure when using these bits as burning of the wood may occur.
7. Start the motor and move the router over the stock while holding the router base flat on the stock and the guide tight against the edge of the stock.	
8. Turn off the switch and allow the router to stop before moving the router from the work.	NOTE: When looking at the router motor from the rear, the cutter will rotate in a clockwise direction. The direction of feed should always be against the cutting edge of the bit. A good example of this is a frame such as a window frame or a picture frame. On the outside the feed is counter-clockwise. On the inside the feed is clockwise.

METHOD OF EVALUATION:

1. Selection of cutter
2. Preparation of equipment
3. Cutting sequence
4. Appearance of cut

OPERATION SHEET
SC-2-36

COMPETENCY: Dado, Rabbet, or Plow with a Router

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to dado, rabbet or plow with a router

Page 1 of 2 pages

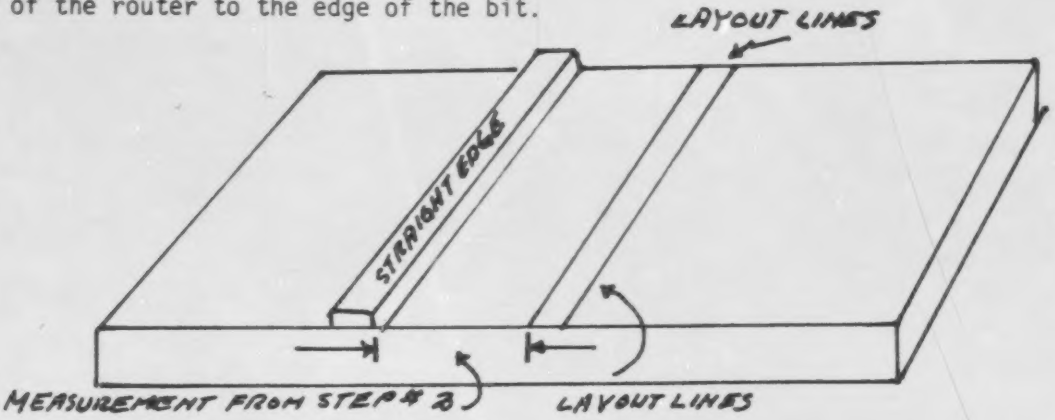
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Install a bit in router, if possible, the diameter of the bit should equal the width of the groove or dado.	NOTE: When you are pushing the router the edge guide should be to your right when you are pulling, the edge guide should be to your left.
2. Adjust the router base to give the desired depth of cut.	
3. Adjust the edge cutting guide so the bit is cutting the desired distance from the edge or end.	
4. Fasten the stock securely.	
5. Place the router base on the stock so the bit is almost touching the stock.	
6. Start the motor and move the router over the stock while holding the base flat on the stock and the edge guide tight against the edge.	NOTE: Grooves, dados or rabbets wider than the diameter of the cutter can be cut by changing the edge guide and making more than one pass across the work.
7. Turn off the switch and allow the motor to come to a complete stop before moving the router from the work.	NOTE: A straightedge may also be used to guide the router in a straight line. In this case, the edge of the router base is held against the straightedge. The direction of feed in this case is important. Keep in mind if you are pushing the router, the straightedge should be to your left. If pulling the router, the straightedge should be to your right.

COMPETENCE - PROCEDURE/STEPS   TEACHING/LEARNING ACTIVITIES

CUT A GROOVE OR A DADO WITH A ROUTER (USING A STRAIGHTEDGE AS A GUIDE):

1. Install a straight cutting router bit and adjust it to depth.

2. Measure the distance from the outer edge edge of the router to the edge of the bit.



3. Clamp a straightedge parallel to the layout line. (The distance from the line is the distance found in Step 2.)

4. Place the leading edge of the router base on the stock so that the bit is almost touching the stock.

5. Turn on the power and push or pull the router across the stock. The router base must stay against the straightedge if a straight cut is to be made.

NOTE: When you push the router, the straightedge should be to your left. When you pull, the straightedge should be to your right.

METHOD OF EVALUATION:

Check position and accuracy of dados.

OPERATION SHEET
SC-2-37

COMPETENCY: Use a Belt Sander

COURSE: Carpentry

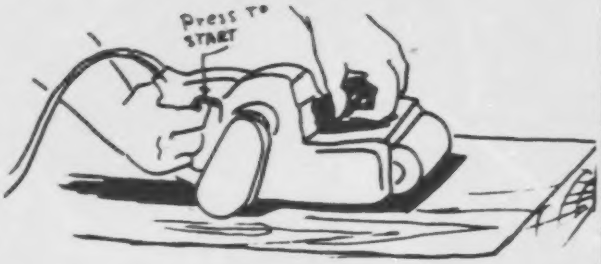
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to sand stock accurately with a belt sander

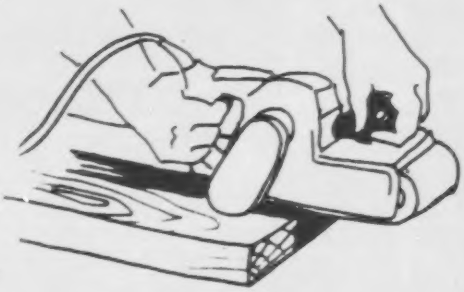
Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Install sanding belt of desired coarseness.
2. Place the workpiece against a stop.
3. Check to see that switch is in off position.
4. Connect the sander to the power source and align the sanding belt to run in the center of the platen.
5. With the motor turned off, place the sander in position flat on the board with the belt running in the direction of the grain. (The stop should be located to the rear of the sander.)
6. Hold the sander handle with one hand and the guide knob with the other.
7. Start the motor by squeezing the trigger switch with your index fingers. Allow the sander to move forward as the switch is turned on.



8. Guide the sander over the surface with overlapping strokes parallel to the grain.
9. Keep the sander flat and always keep it moving. When possible, sand the entire length of the board on each pass.
10. When sanding near the end of a board, hold the sander level and keep it from sagging.

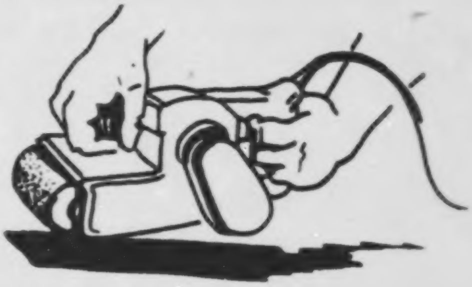


COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES

11. Use successively finer grit belts until the desired finish is obtained.

12. Lift the sander from the work and release the switch. Wait until the belt stops before letting the sander down.

13. Lay the sander on its side when not in use.



METHOD OF EVALUATION:

1. Correct installation of belt
2. Sanding technique
3. Appearance of work

OPERATION SHEET
SC-2-38

COMPETENCY: Use a Finishing Sander (Oscillating)

COURSE: Carpentry

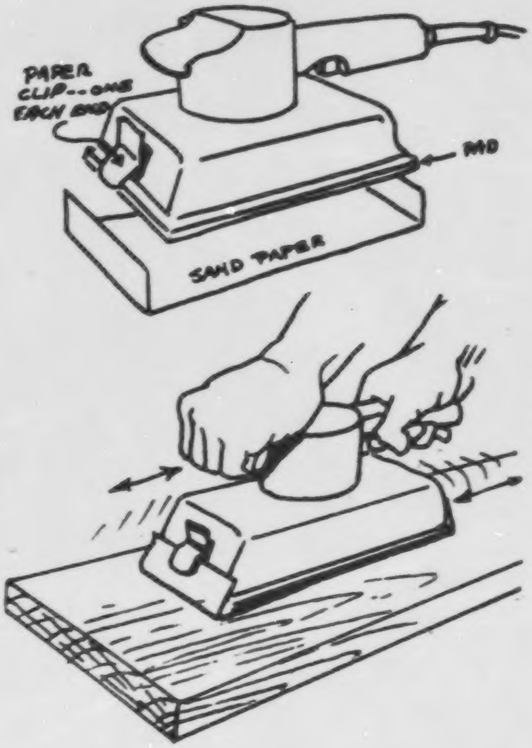
UNIT II: Hand and Machine Tool Processes

OBJECTIVE: The student will be able to sand stock accurately with an oscillating sander

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Attach a sanding sheet of the proper grit size to the sanding pad.
2. Be sure the switch is in the "OFF" position, then connect to the power source.
3. Clamp the workpiece if necessary.
4. Set the sander on the work and start the motor.
5. Move the sander back and forth slowly over the work in an overlapping pattern.
6. Use successively finer grit until the desired finish is obtained.
7. Lift the sander from the work before stopping the motor and waiting until the motor stops before setting it down.



METHOD OF EVALUATION:

1. Correct installation of sandpaper
2. Sanding technique
3. Appearance of work

OPERATION SHEET
SC-3-1

COMPETENCY: Rip with Radial Arm Saw

COURSE: Carpentry

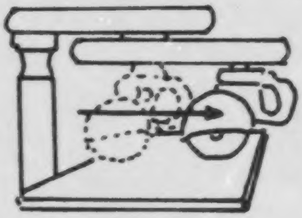
UNIT III: Building Layout

OBJECTIVE: The student will be able to rip stock accurately with a power saw

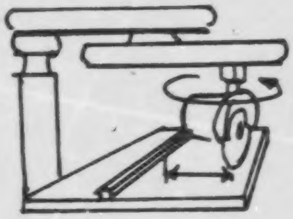
Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

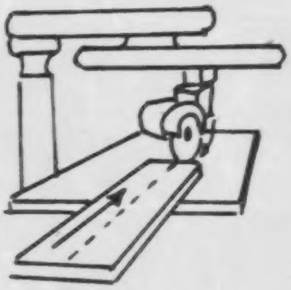
TEACHING/LEARNING ACTIVITIES



1. Use a rip or combination blade.
2. Lock the miter scale at zero (arm at right angle to the fence).
3. Raise the column until the saw blade clears the table.



4. Pull the saw forward to the end of the arm, release the yoke clamp and the swivel latch, then rotate the motor yoke 90^0 to the rip position (saw blade parallel to rip fence).
5. Move the motor assembly until the blade is located the desired distance from the fence. Lock in position.



6. Lower the saw until the blade just clears the table.
7. Adjust the guard on the infeed end until it clears the work by about ¼".
8. Adjust the anti-kickback fingers until they rest lightly on the surface of the stock.
9. Start the motor and lower the column until the saw blade contacts the table.
10. Place the straightedge of the stock against the fence and slide the stock across the table against the rotation of the blade.
11. Finish making the cut with a push stick.

NOTE: Caution! When ripping on the radial saw, stock should always be fed from the side opposite the anti-kickback device.

COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES
12. Shut off the power and allow the motor to stop before leaving the machine.	

METHOD OF EVALUATION:

1. Safety precautions
2. Adjustment of saw
3. Sawing procedure
4. Accuracy of cut

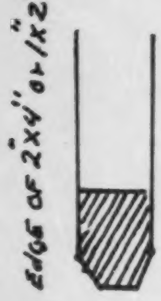
COMPETENCY: Point Stakes with a Hatchet

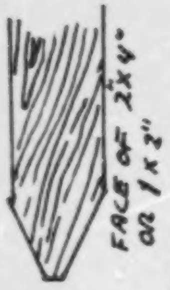
COURSE: Carpentry　　　　**UNIT III:** Building Layout

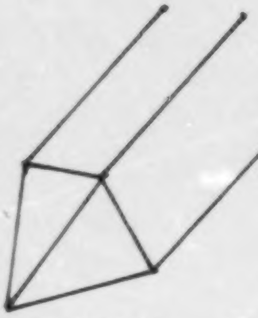
OBJECTIVE: The student will be able to put a piece of wood so it can be driven in the ground more easily

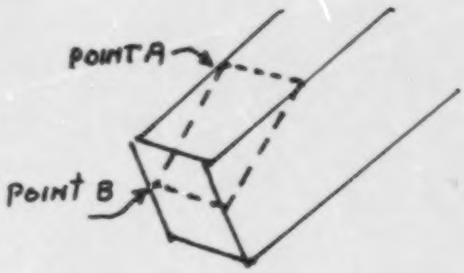
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lean the top of the stake a little to left so that the hatchet can be swung almost vertically.	. IL-3-1 . IL-3-6
2. By eye, find the starting point and the line of the cut.	CAUTION: Be Careful! The hatchet is sharp and will cut fingers, toes and legs, as well as wood.
3. Start cutting at point "A" and take as many cuts as necessary to reach point "B".	NOTE: The angle of the cut should be about 30°, with the face and the edge being cut. A general rule is that the length of the cut should be about equal to the width of the stake being cut.
4. If you are sharpening 2 X 4's or 1 X 2's, turn them 180° and sharpen the other edge. Then sharpen both faces slightly so that the sharpened stake looks like the one shown here.	
5. If you are sharpening 2 X 2's, cut all four sides the same so that the finished stake looks the same on each of the four sides.	









METHOD OF EVALUATION:

The instructor will observe the student in the act of pointing stakes with a hatchet.

OPERATION SHEET
SC-3-3

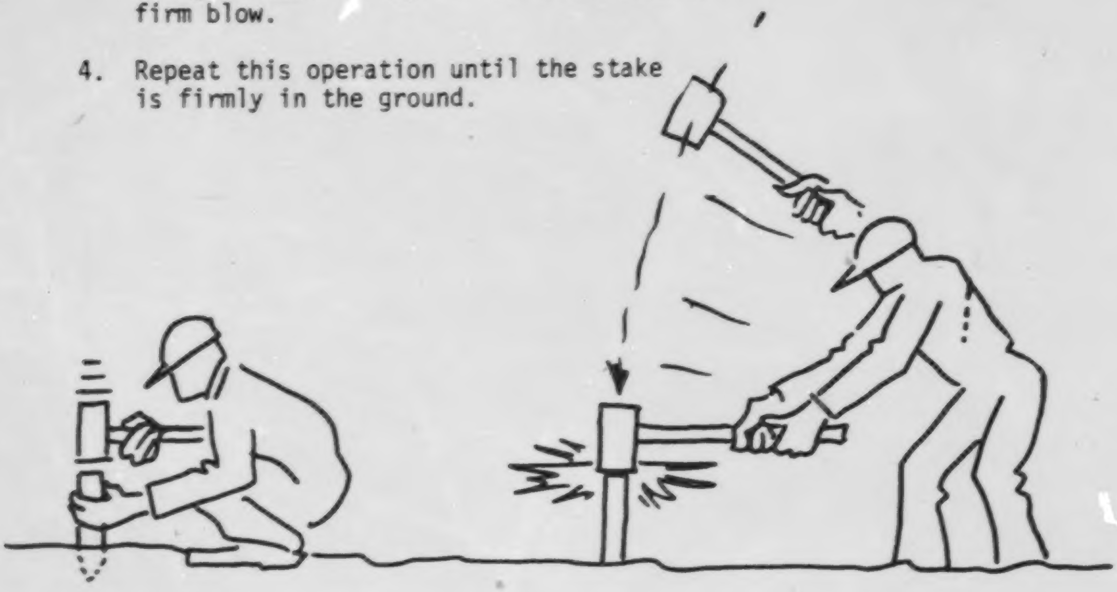
COMPETENCY: Drive Stakes with a Sledge

COURSE: Carpentry UNIT III: Building Layout

OBJECTIVE: The student will be able to drive stakes properly and safely

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Drive the stake slightly into the ground, just enough so it will stand up without holding it.	NOTE: Keep your eye on the stake at all times. This way you will develop eye and arm coordination.
2. Step back from the stake so that when your arms are just about fully extended, the nead of the sledge will rest squarely on the stake.	
3. Lift the sledge above your head and bring it down on top of the stake with a firm blow.	
4. Repeat this operation until the stake is firmly in the ground.	



METHOD OF EVALUATION:

The instructor will observe the student driving stakes.

OPERATION SHEET
SC-3-4

COMPETENCY: Measuring with a Steel Tape

COURSE: Carpentry

UNIT III: Building Layout

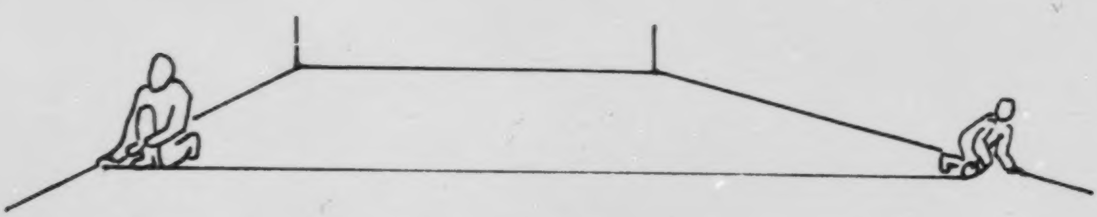
OBJECTIVE: The student will be able to take accurate outside and inside measurements with a long steel tape

Page 1 of 2 pages

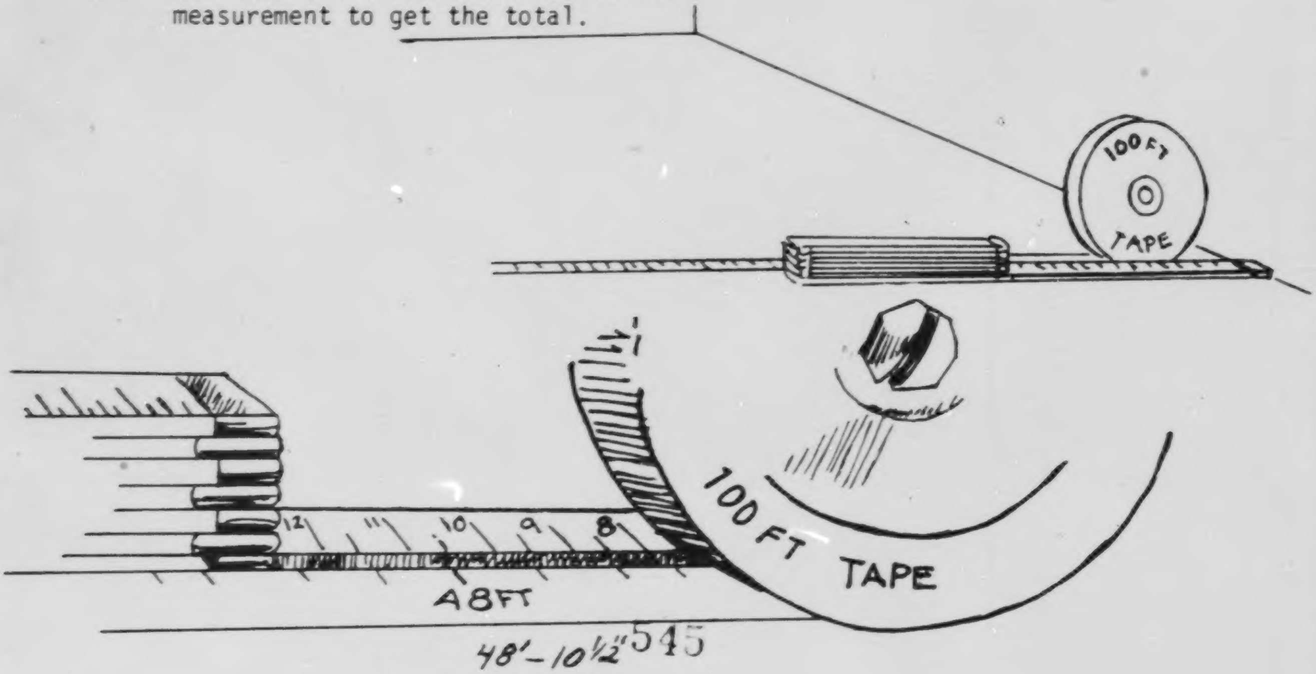
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

TAKE AN INSIDE MEASUREMENT WITH A 100' STEEL TAPE:

1. Have a helper hold the end of the tape against one wall.
2. Unroll the tape to a point near the opposite wall.
3. Use a folding rule to measure from the foot mark nearest the tape case to the wall.



4. Add the foot measurement to the inch measurement to get the total.



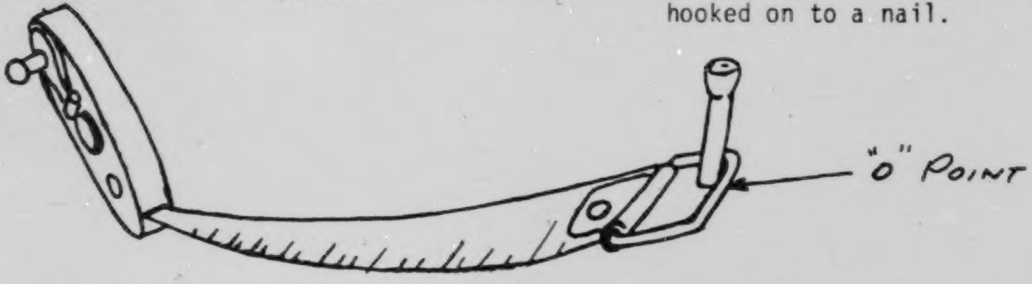
COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

TAKE AN OUTSIDE MEASUREMENT WITH A 50' OR 100' STEEL TAPE:

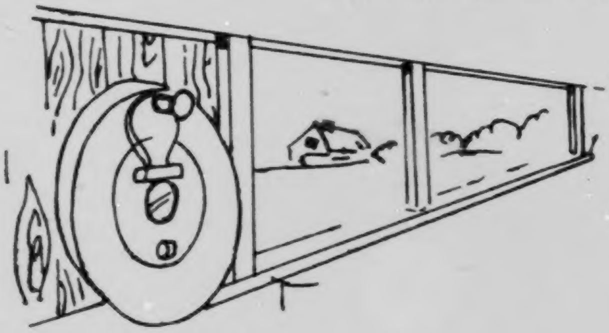
1. Secure the ring at the end of the tape to one end of the space to be measured.

NOTE: The "0" point on most tapes is on the outside of the ring. Therefore, an allowance must be made for the thickness of the ring when the tape is hooked on to a nail.



2. Uncoil the tape along the space to be measured.

NOTE: Make sure that it lays flat and has no kinks in it.



3. Pull the tape tight to the other end of the space to be measured.
4. Read or mark the dimension.
5. Rewind the tape.

METHOD OF EVALUATION:

Instructor will check measurements against his own figures.

OPERATION SHEET
SC-3-5

COMPETENCY: Stretch and Attach Dryline to Stakes or Nails

COURSE: Carpentry — **UNIT III:** Building Layout

OBJECTIVE: The student will be able to attach a taut dryline to stakes or nails so it can be removed easily

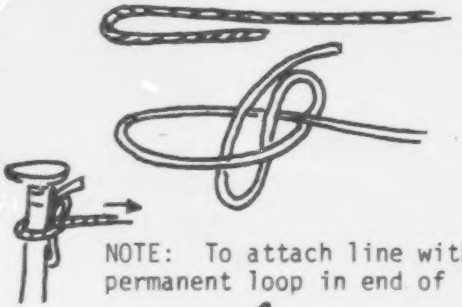
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

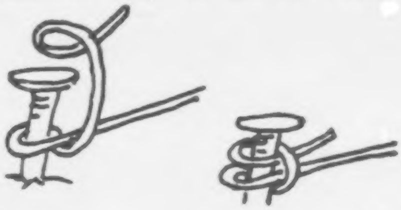
1. Place loop end of dryline over nail in top of stake.
2. Stretch line to second stake and rap around nail once, passing end under taut line.
3. While holding line taut with one hand make a second loop with free end under and slip loop down over nail.
4. Draw loop tight around nail to secure line.
5. To attach line to wood stakes instead of nails pull line taut and wrap several times around stake.
6. Keep tension on loose end and grasp line as shown in sketch.
7. Pull loose end back under taut line so line secures loose end.

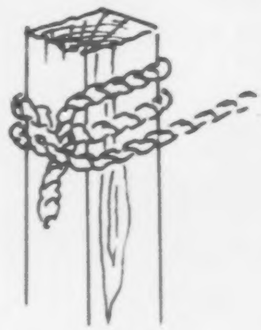
TEACHING/LEARNING ACTIVITIES

NOTE: Make loop in end of line.



NOTE: To attach line without permanent loop in end of line.





METHOD OF EVALUATION:

Instructor will check attached lines for holding power.

OPERATION SHEET
SC-3-6

COMPETENCY: Set Up Builder's Level

COURSE: Carpentry

UNIT III: Building Layout

OBJECTIVE: The student will be able to become acquainted with the proper method to set up the builder's level

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Place the tripod so it stands firm and solid.
2. Tighten the wing nuts at the top of the tripod legs into a firm position.
3. Remove the screw cap from the tripod, lift the instrument by the frame, set it on to the tripod head.
4. Hold the level by the frame and screw the leveling head firmly into place.
5. Turn the instrument so the telescope is parallel to two of the leveling screws.
6. Turn the screws simultaneously with the thumb and forefinger of each hand, one clockwise and the other counter-clockwise until the bubble is centered in the tube.
7. Turn the instrument until the telescope is parallel to the second pair of leveling screws and repeat previous procedure.
8. Return to the first pair and re-center the bubble. Return to the second pair and check the level.
9. Turn the instrument 180° and check that the bubble is still centered as it should be in this and in any other position of the telescope.

TEACHING/LEARNING ACTIVITIES

The legs should be spread so when the instrument is mounted the eyepiece will be at a comfortable height for the user. Try to set it so that the tripod head is as level as you can judge by eye.

NOTE: Be sure that the horizontal clamp screw is loose.

CAUTION: Engage the mounting screw carefully to prevent cross-threading.

The instrument is now ready to be leveled. This operation must be carried out carefully and precisely, not only to obtain accurate results but also to insure that the screw threads are not damaged by too much pressure.

CAUTION: Be sure that both screws are exerting light pressure against the leveling head but do not exert excess pressure on them.

. IL-3-11

METHOD OF EVALUATION:

Instructor will check instrument level and set up procedure.

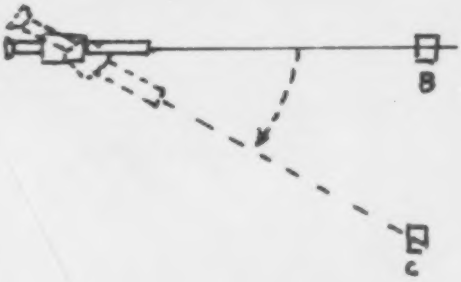
OPERATION SHEET
SC-3-7

COMPETENCY: Measure or Layout Horizontal Angles with Builder's Level-Transit

COURSE: Carpentry UNIT III: Building Layout

OBJECTIVE: The student will be able to measure or layout angles with a builder's level as when staking out for a building

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set up the level transit over a predetermined point.	NOTE: This point can be a mark on the floor, a stake driven in the ground, a nail driven in a driveway, etc.
2. Sight the level transit on a second point from which the angle will be measured. (Point "B")	
3. Tighten the horizontal clamp screw and then bring the vertical cross hair into exact alignment with the horizontal tangent screw.	
4. Set the horizontal circle to the zero (0^o) mark.	
5. Loosen the horizontal clamp screw and turn the instrument to sight on the third point to which the angle is to be measured (Point "C").	
6. Repeat step 3 to align the vertical cross hair.	
7. Read the angle on the circle and vernier scale.	
8. Check to see whether the cross hairs appear sharp and clear. If they do not, focus them by turning the eyepiece ring.	NOTE: The instrument is now ready to use to sight levels.

METHOD OF EVALUATION:

The instructor will check to determine accuracy of set-up.

OPERATION SHEET
SC-3-8

COMPETENCY: Check for Level or Plumb with a Carpenter's Level

COURSE: Carpentry — UNIT III: Building Layout

OBJECTIVE: The student will be able to establish or check for true horizontal and vertical surfaces

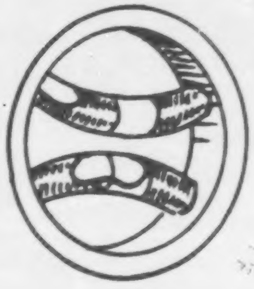
Page 1 of 2 pages

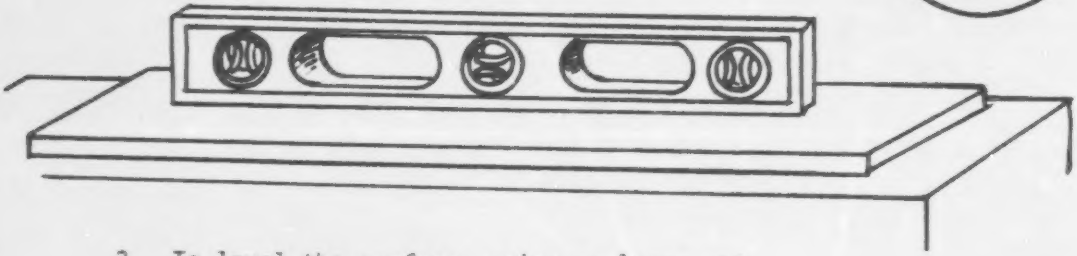
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

Test a horizontal surface with a carpenter's level:

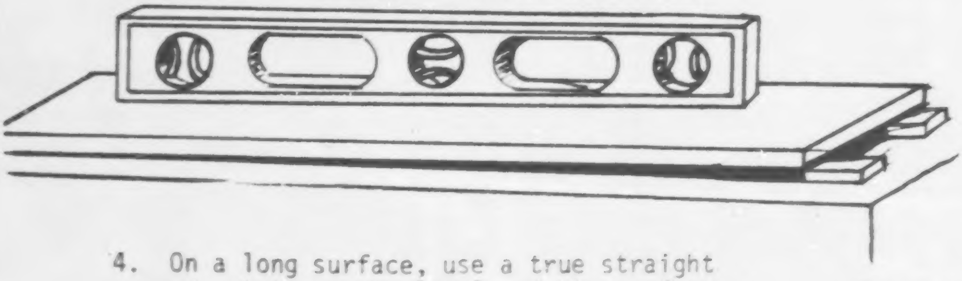
1. Clean the dirt off the surface to be tested and lay the edge of the level on it, parallel to the edges of the surface.

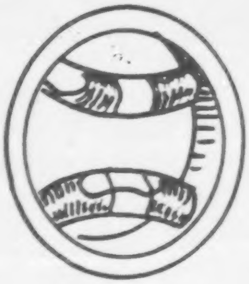
2. Check the position of the bubble in the bottom level tube.



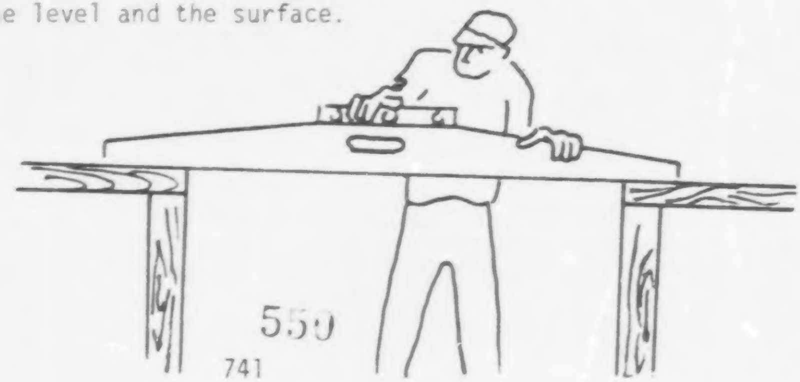


3. To level the surface, raise or lower one end of the surface until the bubble is centered between the reference lines.





4. On a long surface, use a true straight edge between the level and the surface.



COMPETENCE - PROCEDURE/STEPS	TEACHING/LEARNING ACTIVITIES

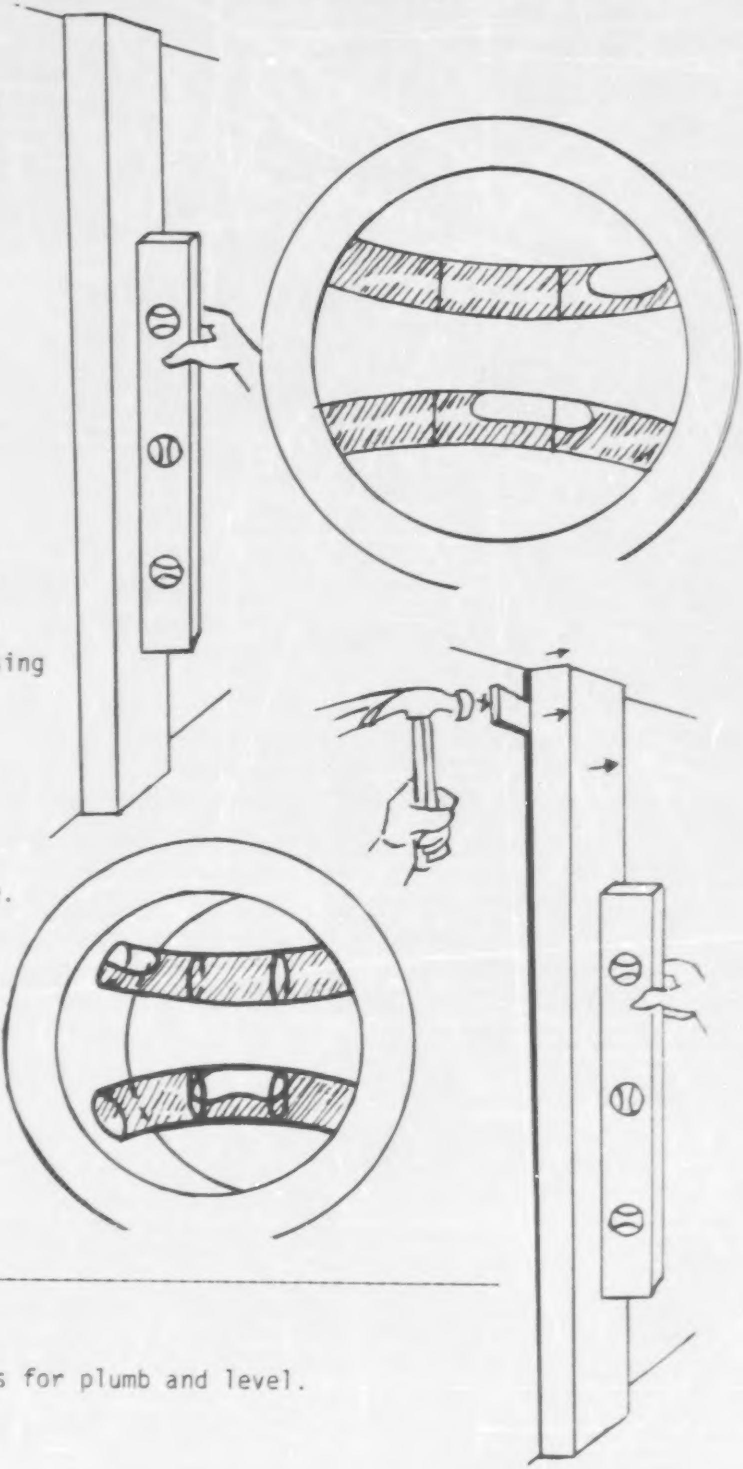
Plumb a vertical surface with a level:

1. Hold the level vertical with its edge against the surface to be checked.

2. Check the bubbles in the crowned tubes.

3. Plumb the surface by tilting it until the bubbles seem to be centered between the reference lines. The surface may have to be adjusted by using shims or wedges.

4. Use a true straight edge between the surface and the level to plumb a long surface.



METHOD OF EVALUATION:

Instructor will check surfaces for plumb and level.

OPERATION SHEET
SC-4-1

COMPETENCY: Plumb With The Plumb Bob

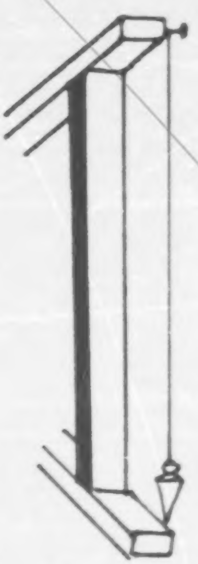
COURSE: Carpentry

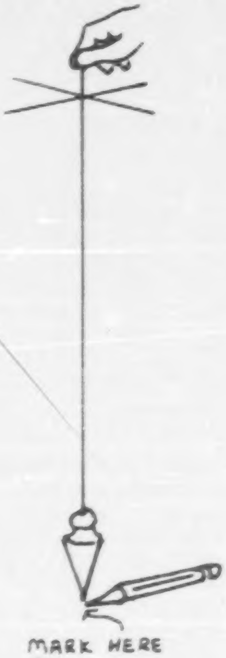
UNIT IV: Foundations and Concrete Forms

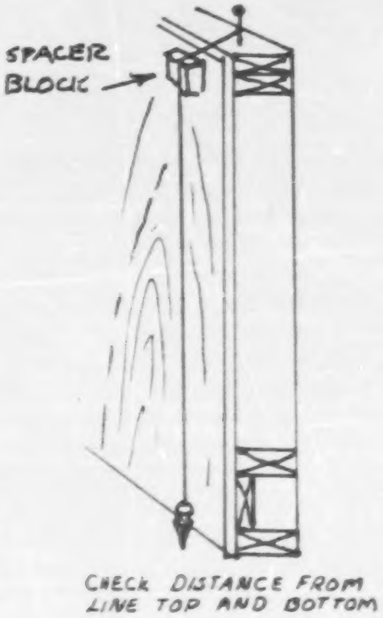
OBJECTIVE: The student will be able to accurately transfer a point above to a point directly below so they are plumb (vertical one over the other)

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Hold or suspend the line attached to the plumb bob at the point or against the object being plumbed. 2. When plumb bob is motionless (hand steady no wind blowing) place a point or small "x" exactly below the point of the plumb bob.	NOTE: The plumb bob is used to set things, such as wall frames, plumb. It is used to plumb points down from above or up from below, and it is used to check things that are in place to see if they are plumb.







METHOD OF EVALUATION:

Instructor will inspect work with plumb bob or level and straightedge.

OPERATION SHEET
SC-4-2

COMPETENCY: Use a Portable Circular Saw

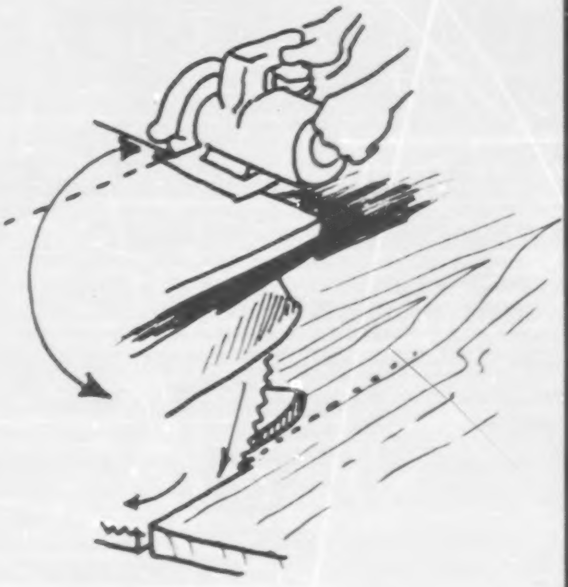
COURSE: Carpentry

UNIT IV: Foundations and Concrete Forms

OBJECTIVE: The student will be able to cut stock accurately with a portable circular saw

Page 1 of 2 pages

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Place the base of the saw on top of the stock and adjust the blade for depth of cut.	NOTE: Install proper blade for type of work being done.
2. Check to see that the saw is set to make a square cut.	NOTE: Make sure work is well supported both before and during the cutting operation. Small pieces should be clamped to sawhorses or a bench.
3. Connect the saw to the power source.	
4. Place the base of the saw on top of the stock and bring the saw blade up to the desired point of cut.	
5. Hold the handle of the saw with the right hand with the index finger in position to control the switch. Hold the guide knob or handle with the left hand to help guide the saw.	CAUTION: Be careful not to turn on the motor when picking up the saw by the handle. It is a good idea to keep the index finger extended until ready to turn on the motor.
6. Align the mark or cutout at the front of the base with the layout line. The saw blade should be aligned on the waste side of the line.	
7. Back the saw up slightly to have the blade clear of the stock and press the switch with the index finger to start the motor.	
8. Align the cutting guide with the layout line and push the saw forward slowly to start cutting.	
9. If traveled off the line, back up and start again.	
10. If the saw begins to slow down, ease up on the feed pressure.	



COMPETENCE - PROCEDURE/STEPS

TEACHING/LEARNING ACTIVITIES

11. If the saw blade stalls, back the blade out of the cut until the saw resumes full speed, then continue the cut.

12. When the cut is completed, release the switch and allow the motor to stop before removing the saw from the work.

METHOD OF EVALUATION:

1. Equipment preparation
2. Stock preparation
3. Sawing technique
4. Accuracy of cut

OPERATION SHEET
SC-4-3

COMPETENCY: Cut Metal with a Hack Saw

COURSE: Carpentry

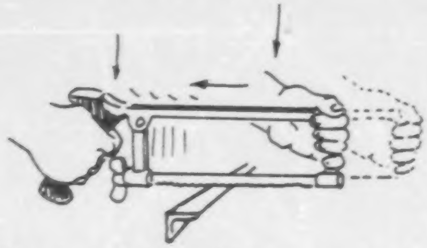
UNIT IV: Foundations and Concrete Forms

OBJECTIVE: The student will be able to properly and safely use the hack saw

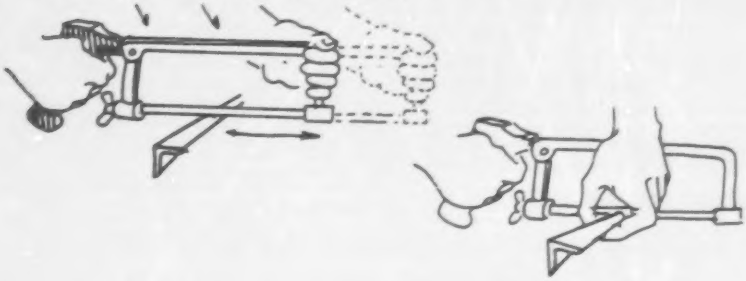
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Hold saw as shown.



2. Start cut by pulling saw back (lightly).
3. Push saw forward (firmly).
4. Pull saw back (lightly).
5. Continue until cut is complete.
6. Near end of cut, ease up on forward pressure and slow down to avoid slipping and injury.



METHOD OF EVALUATION:

1. Proper procedure used
2. Proper safety rules followed
3. Care and use of tools and work area

OPERATION SHEET
SC-4-4

COMPETENCY: Snap Line With Chalkline

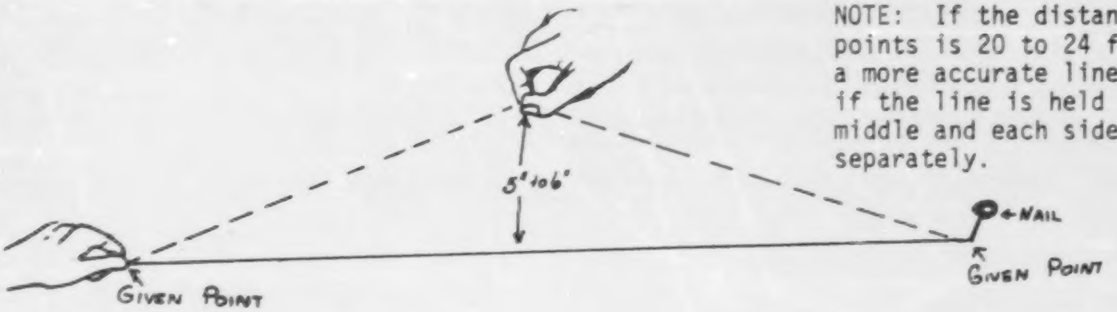
COURSE: Carpentry

UNIT IV: Foundations and Concrete Forms

OBJECTIVE: The student will be able to mark a straight line between two given points using a chalkline

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
	NOTE: The chalkline can be held by someone at each of the given points, or a nail may be driven at one end with the end at the chalkline hooked over the nail.
1. Withdraw the chalkline from the reel (already chalked) and stretch it over the second point. Stretch line tight but not to the breaking point. 2. Press the end down firmly on the mark. 3. Reach out toward the center and grasp the line with thumb and finger and lift it straight up 5 or 6 inches. 4. Allow the line to snap back to the surface. This will deposit chalk on the surface to form a straight line between the two points.	
	NOTE: If the distance between points is 20 to 24 feet or more, a more accurate line will result if the line is held down in the middle and each side snapped separately.



METHOD OF EVALUATION:

Instructor will check procedure and sight line.

OPERATION SHEET
SC-4-5

COMPETENCY: Align Framing With Line and Blocks

COURSE: Carpentry

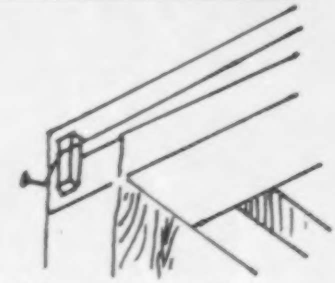
UNIT IV: Foundations and Concrete Forms

OBJECTIVE: The student will be able to use a gage line in aligning walls

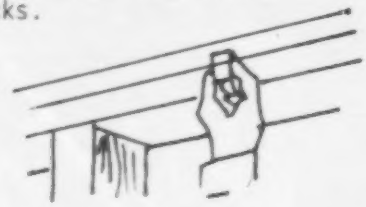
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

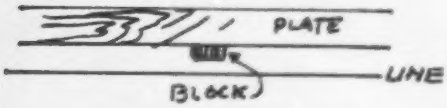
1. Prepare three blocks of wood 3/4" x 2" long.
2. Nail one block at each end of the framing to be straightened.
3. Attach chalkline or dry line to nails driven just beyond blocks as shown.
4. When the line is in place and braces are ready to be fastened, check framing with gage (3rd) block.
5. When the wall is in the correct position so the gage block just passes between framing and the line, brace the framing and recheck with the gage block.
6. Use the gage block at each point where a brace is required.

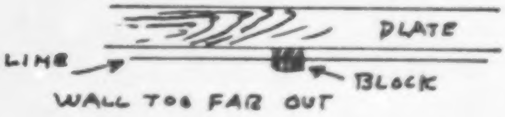


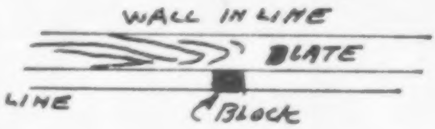
NOTE: Make sure the line is stretched taunt over blocks.



NOTE: Make sure that the wind is not blowing the gage line out of line. It is usually best to start at the middle of the wall and then proceed to the remainder of the wall and then to remaining walls.







METHOD OF EVALUATION:

Instructor will check the finished work.

OPERATION SHEET
SC-4-6

COMPETENCY: Taper Stock with Jointer

COURSE: Carpentry

UNIT IV: Foundations and Concrete Forms

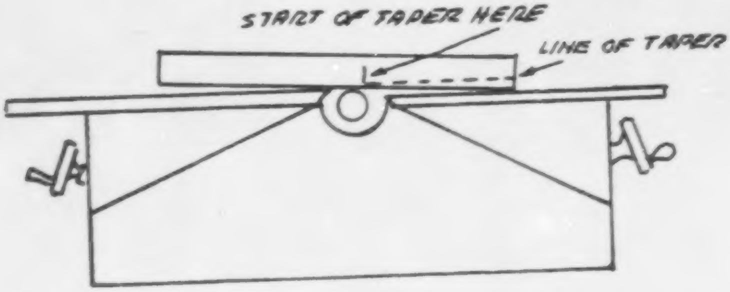
OBJECTIVE: The student will be able to taper a piece of stock to a given angle using the jointer

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Lay out stock to specified taper.
2. Check knives and adjust in-feed table to 1/16" depth of cut.
3. Turn on machine.
4. Carefully move guard to the side enough to allow stock to be placed as in Fig. 1.

NOTE: Stock is placed on the out feed table at the starting point of the taper each time and then passed over the knives.



5. Pass stock over knives to make first cut.
6. Continue this procedure until the layout line has been reached and the taper is complete.

METHOD OF EVALUATION:

Taper will be checked for correct angle and length.

OPERATION SHEET

SC-4-7

COMPETENCY: Bevel or Chamfer With Jointer

COURSE: Carpentry

UNIT IV: Foundations and Concrete Forms

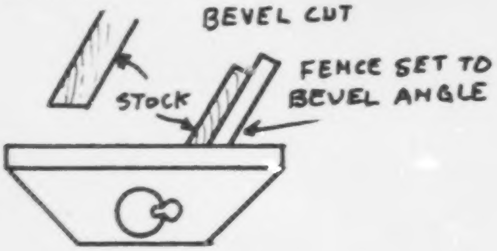
OBJECTIVE: The student will be able to accurately bevel and chamfer stock to a given angle using the jointer

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Check jointer knives for condition.
2. Set jointer fence to the given bevel angle as indicated on the degree scale. The fence may also be adjusted to a T-bevel and set to the correct angle.
3. Set in-feed table to 1/16" depth of cut.
4. Place stock against fence.
5. Push stock forward into knives to make first cut. Push stock all the way through until guard returns.
6. Continue to make cuts until the bevel is complete. Fig. 1.

NOTE: For thin stock 3/4" or less and soft wood, the depth of cut may be increased to 1/8".



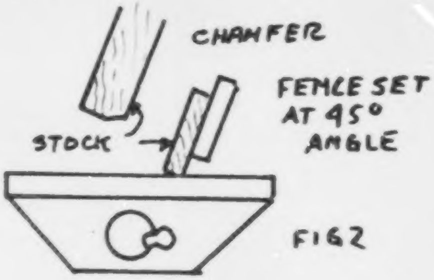


FIG2

7. Cut a chamfer by setting the jointer fence to a 45° angle (the usual chamfer angle) as in step 2 above.
8. Hold stock against fence and push it across the knives.

NOTE: Do not allow stock to slide down and away from the fence.

9. Pass the stock over the knives until the correct chamfer is made.

METHOD OF EVALUATION:

Chamfer and bevel will be checked for accuracy and uniformity.

OPERATION SHEET
SC-5-1

COMPETENCY: Assemble Framing Members by Toenailing

COURSE: Carpentry   UNIT V: Floor Framing

OBJECTIVE: The student will be able to practice and learn toenailing

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

1. Start the nail first and then hold the piece in the proper position.
2. Let the piece crowd over the line a little and as the nail is driven into the piece, it will draw back to the line.
3. As the nail is driven in and the piece is drawn back to the line, stop and nail from the other side. Then finish driving the nail on the first side.
4. When necessary, lower the nail to a lesser angle until the point of the nail enters the wood and then raise the nail to about 50 degrees.

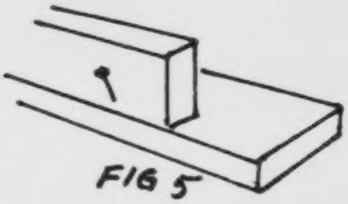


FIG 5

5. Align a frame member by toenailing through the edge of one member into the face of the other. Fig. 3.
6. Blind nail tongue and groove stock. Fig. 4.

TEACHING/LEARNING ACTIVITIES

NOTE: The angle for most toenailing is about 50 degrees; however, slight variations may be necessary as conditions require.

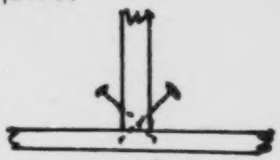


FIG 1

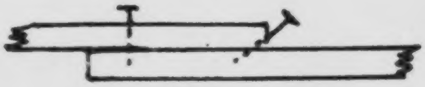


FIG 2

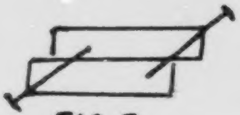


FIG 3

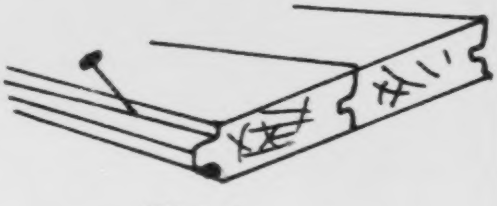


FIG 4

METHOD OF EVALUATION:

The instructor will check the toenailed member for accurate positioning.

OPERATION SHEET
SC-5-2

COMPETENCY: Bevel With Radial Arm Saw

COURSE: Carpentry | **UNIT V:** Floor Framing

OBJECTIVE: The student will be able to set up and cut bevel miters with radial arm saw

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Raise the saw above the table to allow the blade to clear the table when set at the desired angle.
2. Hold the saw with one hand and release the bevel clamp lock.
3. Pull the bevel locating pin from its slot and move the saw to the desired angle on the bevel scale.
4. Lock the bevel clamp.
5. Push the saw to the rear and lower the blade until the teeth just clear the table.
6. Turn on the power while holding the handle of the saw with one hand.
7. Lower the arm to allow the blade to cut into the table.
8. Place the stock to be cut against the fence.
9. Pull the saw forward until it almost touches the stock.
10. Move the stock into position so the cutting will be done on the waste side of the cutting line.
11. Pull the saw slowly through the stock.
12. Push the saw to the rear of the table.
13. Shut off the power and wait for the saw to stop before leaving it.

METHOD OF EVALUATION:

Operation will be checked for correct procedure and accuracy of bevel.

OPERATION SHEET
SC-6-1

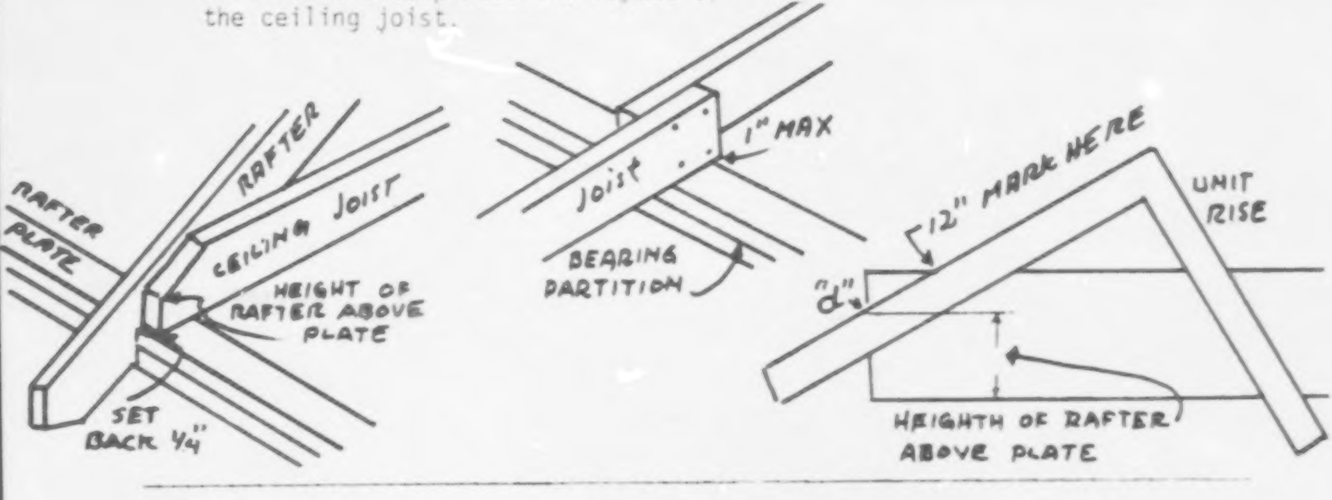
COMPETENCY: Lay Out Pattern for Ceiling Joists

COURSE: Carpentry — UNIT VI: Wall Framing

OBJECTIVE: The student will be able to accurately lay out a pattern for ceiling joists

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select a piece of straight stock and determine which is the crown side.	
2. Cut joist to length allowing for overlap at the bearing partition.	NOTE: It is good practice to hold the end of the ceiling joist back 1/4" from the outside edge of the plate. This is to make sure that the joist does not project beyond the plate and above the rafter.
3. Determine height of rafter above the plate and measure up from the bottom along the outside end of the joist, and make a mark at this point.	
4. Apply the framing square as shown in the sketch at right, using 12" on the body and the unit rise of the rafter on the tongue and mark along the body to lay out the pitch angle of the rafter on the end of the joist.	NOTE: With these two figures held at the top edge of the joist, the body of the square must also coincide with point "a" (height of rafter above plate).
5. Cut off square, the other end of the joist. This completes the layout of the ceiling joist.	


RAFTER
PLATE
RAFTER
CEILING JOIST
HEIGHT OF RAFTER ABOVE PLATE
SET BACK 1/4"
JOIST
1" MAX
BEARING PARTITION
12" MARK HERE
UNIT RISE
"a"
HEIGHTH OF RAFTER ABOVE PLATE

METHOD OF EVALUATION:

Instructor will inspect and measure finished work.

OPERATION SHEET
SC-7-1

COMPETENCY: Lay Out Plumb Cut and/or Level Cut on Common Rafter

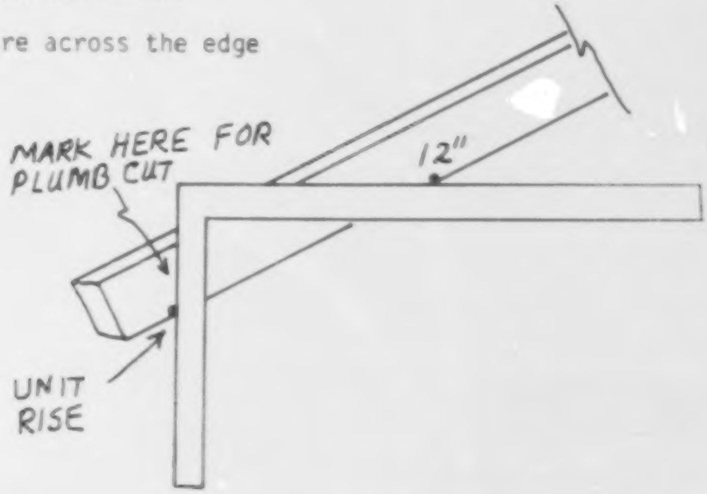
COURSE: Carpentry   UNIT VII: Roof Framing

OBJECTIVE: The student will be able to accurately lay out the plumb cut on common rafters

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Determine rise per foot of run.
2. Use rise per foot of run (unit rise) on the tongue and unit run (12") on the blade.
3. Lay the square on the rafter so that both unit measurements are aligned with the same edge of the stock.
4. Mark the plumb cut along the tongue.
5. Mark the level cut along the blade.
6. Mark the side cut square across the edge of the material.



METHOD OF EVALUATION:

Instructor will inspect the layout.

OPERATION SHEET
SC-7-2

COMPETENCY: Miter with a Radial Saw

COURSE: Carpentry UNIT VII: Roof Framing

OBJECTIVE: The student will be able to set up the radial saw and cut an accurate miter to a given degree.

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Raise the column just enough to have the saw blade clear the table.	
2. Release the overarm locking lever and pin.	
3. Swing the arm to the desired angle.	
4. Lock overarm in position.	
5. Adjust the saw guard to clear the stock.	
6. Lock the saw in the back position. Turn on the motor and lower the column until the blade makes contact with the table.	
7. Hold the stock firmly in position against the fence, release the motor lock, grasp the handle and draw the saw forward to make the cut.	
8. Return the saw to the rear before removing material from the table.	
9. Shut the saw off and allow it to stop before leaving the machine.	

METHOD OF EVALUATION:

1. Check setup and operation.
2. Check angles for accuracy.

OPERATION SHEET
SC-7-3

COMPETENCY: Make A Compound Cut With Radial Saw

COURSE: Carpentry

UNIT VII: Roof Framing

OBJECTIVE: The student will be able to set up the radial saw to accurately cut a compound miter to given degrees

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Raise the saw to allow the blade to clear the table when set at the desired angles.	
2. Hold the saw with one hand and release the bevel clamp lock.	
3. Pull the bevel locking pin from its seat and move the saw to the desired bevel angle as indicated on the bevel scale.	
4. Relock the bevel clamp.	
5. Release the overarm locking lever and pin and swing the arm to the desired miter angle as indicated on the miter angle scale.	
6. Relock the overarm locking lever.	
7. Push the saw to the rear and while holding the saw in this position lower the arm until the blade comes in contact with the table.	
8. Place a scrap piece of material against the fence and make a trial cut.	
9. Check both miter angle and bevel angle for accuracy.	
10. Make the required cut(s).	
11. Return the saw all the way to the rear each time a cut is made and on the final cut return the saw to the rear and shut off the power.	NOTE: Do not leave the machine until the saw stops moving.

METHOD OF EVALUATION:

1. Check setup
2. Check angles for accuracy

OPERATION SHEET
SC-8-1

COMPETENCY: Set Finish or Casing Nails

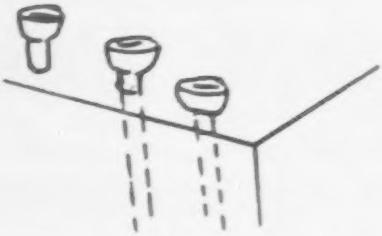
COURSE: Carpentry

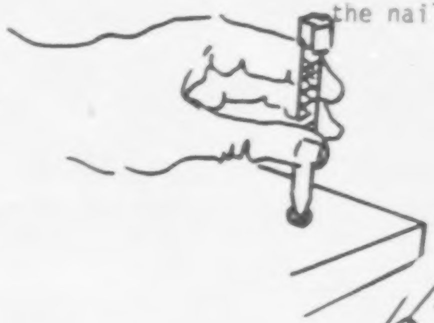
UNIT VIII: Exterior Finish

OBJECTIVE: The student will be able to carefully set nails so heads are below surface to allow for puttying

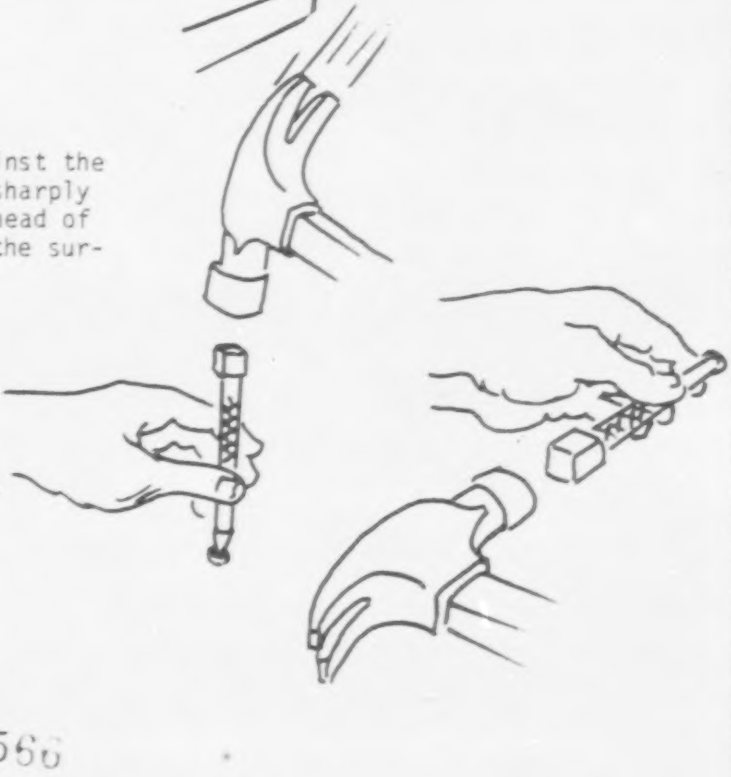
Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Drive the nail until only the head is above the surface of the stock.	
2. Hold the nail set on the nail.	NOTE: Part of hand should rest on the stock to keep the nail set from slipping off the nail.





3. Press the nail set firmly against the nail and strike the nail set sharply with the hammer to drive the head of the nail 1/16" to 1/8" below the surface of the stock.



METHOD OF EVALUATION:

1. Check for depth of set
2. Check neatness

OPERATION SHEET
SC- 8-2

COMPETENCY: Cutting Heavy Metal with Hack Saw

COURSE: Carpentry

UNIT VIII: Exterior Finish

OBJECTIVE: The student will be able to cut various metals with a hack saw

Page 1 of 1 page

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Fasten material to be cut in a vise or support firmly on a workbench.	NOTE: Before beginning to make the cut check to see that the blade has the proper tension and that the teeth point away from the handle.
2. Start an accurate cut by using the thumb as a guide (as with a handsaw when cutting wood) and sawing with short strokes.	
3. As the cut deepens, remove the hand being used as a guide and place it on the front of the frame.	NOTE: The procedure listed is for heavier metal stock. When cutting thinner materials such as sheet metal or aluminum siding, the cut is usually made with one hand while using the other hand to hold the material.
4. Hold the handle and front of the frame firmly. Stand at ease facing the work, feet at least 12" apart.	
5. Apply pressure to the saw as the forward stroke is made.	NOTE: Do not allow the teeth of the saw to slip over the work as this will dull the blade.
6. Lift the blade slightly on the return stroke, but do not lift the blade out of the cut.	
7. Cut with about 40-60 strokes a minute.	
8. On heavy work apply more pressure.	NOTE: In addition to the arm movement, a slight swaying of the body in the direction of the cut will help.

METHOD OF EVALUATION:

Instructor will check finished work.

OPERATION SHEET
SC-8-3

COMPETENCY: Cut Thin Metal With Tin Shears

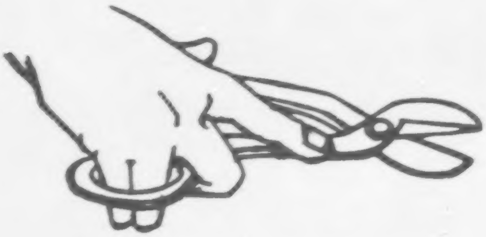
COURSE: Carpentry **UNIT VIII:** Exterior Finish

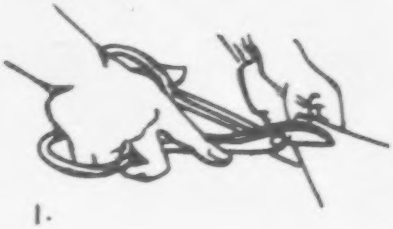
OBJECTIVE: The student will be able to cut thin metal with tin shears

Page 1 of 1 page

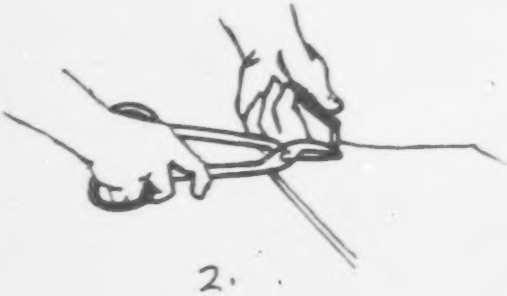
COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Grasp the snips with one hand and the shorter side of the sheet metal in the other.
2. Open the blades wide and start the cut at the edge of the sheet.
3. Hold the blades of the snips at a right angle to the sheet and cut. Keep from getting jagged edges by closing the blades just short of the full length.
4. Start the next cut at the end of the one before.
5. Finish the cut, keeping the snips on the line by changing the angle of the cut if necessary.

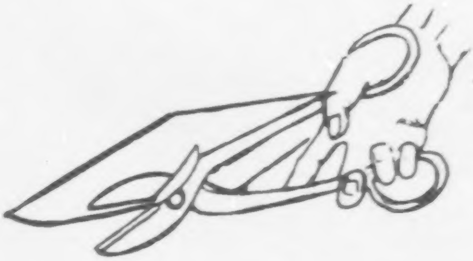




1.



2.



METHOD OF EVALUATION:

Instructor will observe student working.

OPERATION SHEET
SC-8-4

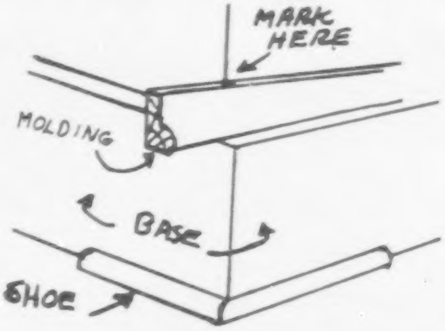
COMPETENCY: Lay Out and Make Mitered Joints in Moldings

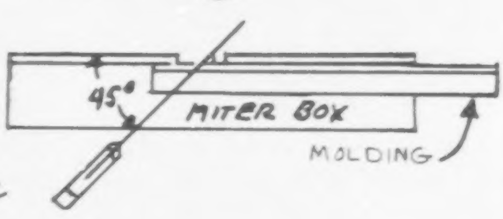
COURSE: Carpentry **UNIT VIII:** Exterior Finish

OBJECTIVE: The student will be able to develop skill in laying out, cutting and installing molding, mitered corners for outside corners and coped corners for inside corners

Page 1 of 1 page

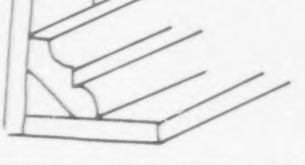
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Select two pieces of molding, several inches longer than the wall to receive the molding (see sketch).	NOTE: Additional length must be allowed for the mitering.
2. Hold a piece of the molding in position and mark the length as shown.	NOTE: This will mark the short point of the miter.
3. Adjust the saw in the miter box to the miter angle (45° for a square corner), lift the saw and place the molding in the box, with the part of the molding that fits against the wall against the back of the box.	NOTE: The miter angle is one half the angle between sides. If the corner is square, the angle between sides is 90°. Therefore, the miter angle is 45°.
4. Adjust the molding so the saw will cut on the waste side of the mark and make the cut, (see sketch).	To determine the miter angle for moldings to be fit around corners with sides other than 90°, determine the angle between sides and divide by two. This then will be the miter angle to which the miter saw will be set.
5. Hold the piece of molding in place and check the cut to see that it is correct.	
6. Hold the second piece of molding in position on the other side of the corner and mark the short point of the miter, at the corner.	
7. Adjust the miter saw to the opposite 45° miter position and make the miter cut on the second piece.	
8. Check the miter cuts for accurate fits and make adjustments if necessary.	
9. Set the two moldings in place so that miters member correctly, and fasten with finish nails. Set nails and sand work clean and smooth.	





METHOD OF EVALUATION:

Work will be checked for correct procedure and neat fit.



OPERATION SHEET
SC-8-5

COMPETENCY: Make a Coped Joint

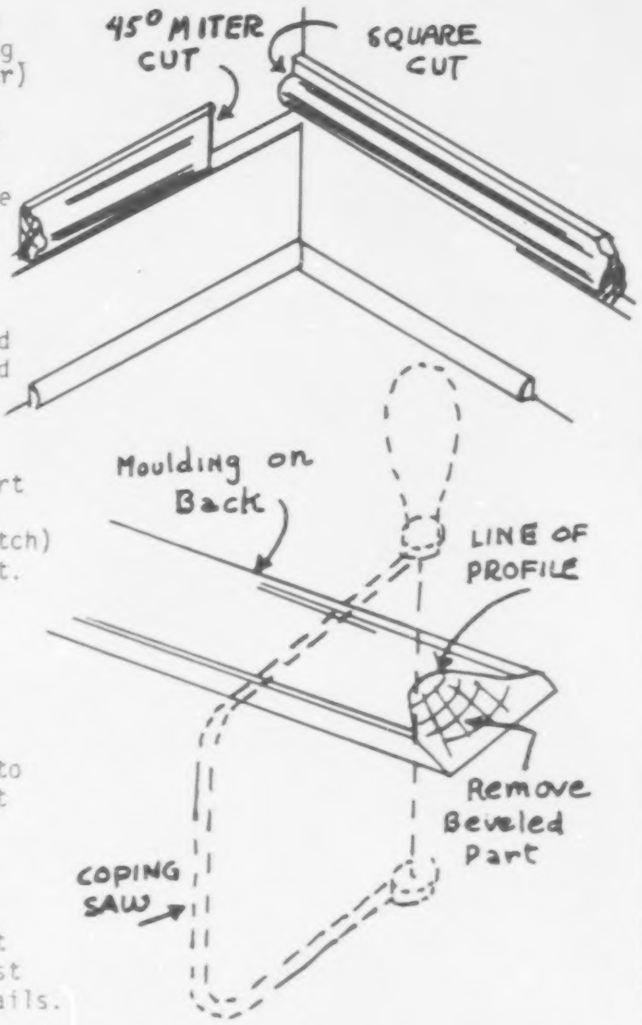
COURSE: Carpentry — UNIT VIII: Exterior Finish

OBJECTIVE: The student will be able to fit two pieces of trim at an inside corner

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Fit two moldings together at an inside corner (which requires that one molding shall be coped to fit against the other) by cutting the first piece of molding into the corner with a square cut (see sketch).
2. Place the other piece of molding in the miter box and make a miter cut on the end as if to make an inside miter.
3. After the miter cut is made, lay the piece of molding with its back down and the mitered end projecting over the end of a trestle.
4. In this position, note the profile of the molding itself. The beveled part of the miter is to be carefully cut away just to the profile line (see sketch) The coping saw is used to make this cut.
5. After the molding has been coped, shape and true the edges with a sharp knife or a piece of medium sand paper rolled into a small spindle.
6. Take measurements and cut the molding to the correct length. Cut moldings about 1/32" long so they can be fit snugly against each other.
7. Set the molding in place and adjust it until the coped end fits neatly against the other molding and also tight against the wall. Nail with 6d or 8d finish nails.
8. Set nails and sand work clean and smooth.



METHOD OF EVALUATION:

Observe fit and quality of finished job.

OPERATION SHEET
SC-8-6

COMPETENCY: Mark Siding to Length with a Siding Hook

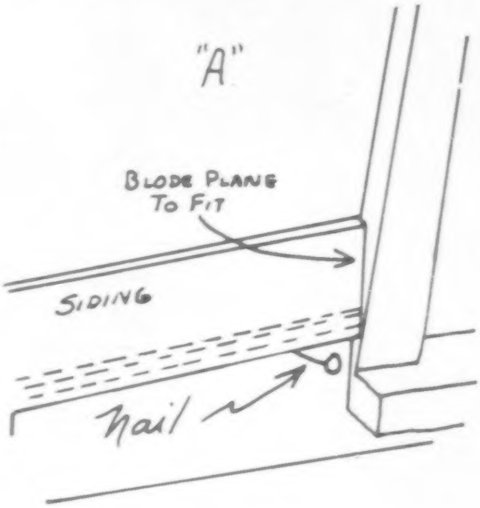
COURSE: Carpentry — UNIT VIII: Exterior Finish

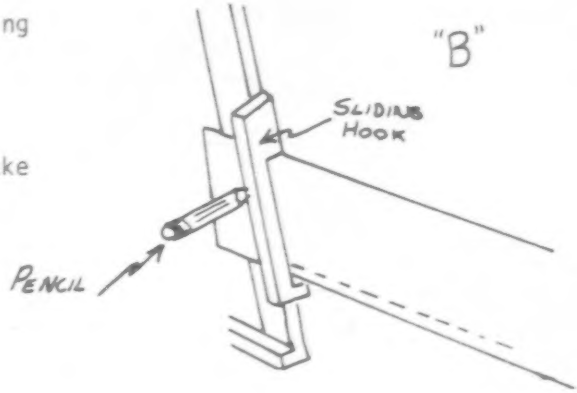
OBJECTIVE: The student will be able to fit a piece of siding board between two vertical trim members

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES

1. Secure a piece of siding about 1/2" or more longer than required.
2. Drive a small finish nail near one window casing and on the gage line of the previous course of siding.
3. Rest one end of the siding on the nail and against the exterior trim as shown in sketch A.
4. Hold the other end of the siding along the gage line and out over the piece of trim to which it will be fit.
5. If necessary, block plane the end of the siding at "A" so it fits tightly against the exterior trim.
6. Mark the siding to length using a siding hook as shown in sketch B.
7. Cut siding with a fine handsaw.
8. Plane the end with a block plane to make a tight fit.





METHOD OF EVALUATION:

Instructor will check the finished work.

OPERATION SHEET
SC-8-7

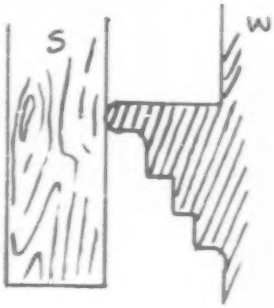
COMPETENCY: Scribe an Irregular Surface with Wing Dividers or Scriber

COURSE: Carpentry UNIT VIII: Exterior Finish

OBJECTIVE: The student will be able to mark stock to fit an irregular surface using the pencil scribers

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Set a piece of stock against the irregular surface.	

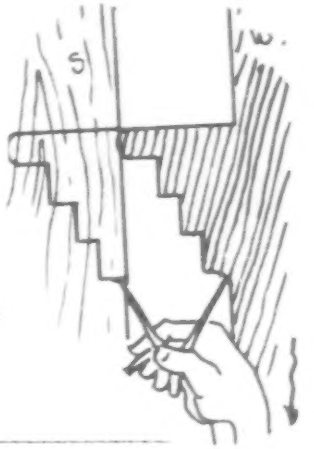


2. Set the divider points at a distance equal to the widest space between the stock and the irregular surface.

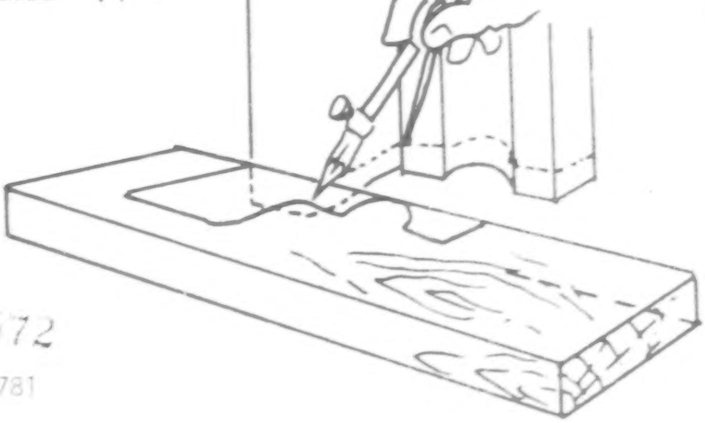
3. Hold the pointed leg of the divider against the surface and mark the stock with the pencil leg.

NOTE: The divider legs must be perpendicular to the surface of the stock or the scribing will not be accurate.

NOTE: A metal scriber point may be used in place of a pencil. When it is used, scored line will result. The scriber point may be needed to mark masonry or metal.



4. Mark the line the whole length of the surface to be fitted.



METHOD OF EVALUATION:

1. Check procedures
2. Accuracy of layout

OPERATION SHEET
SC-8-8

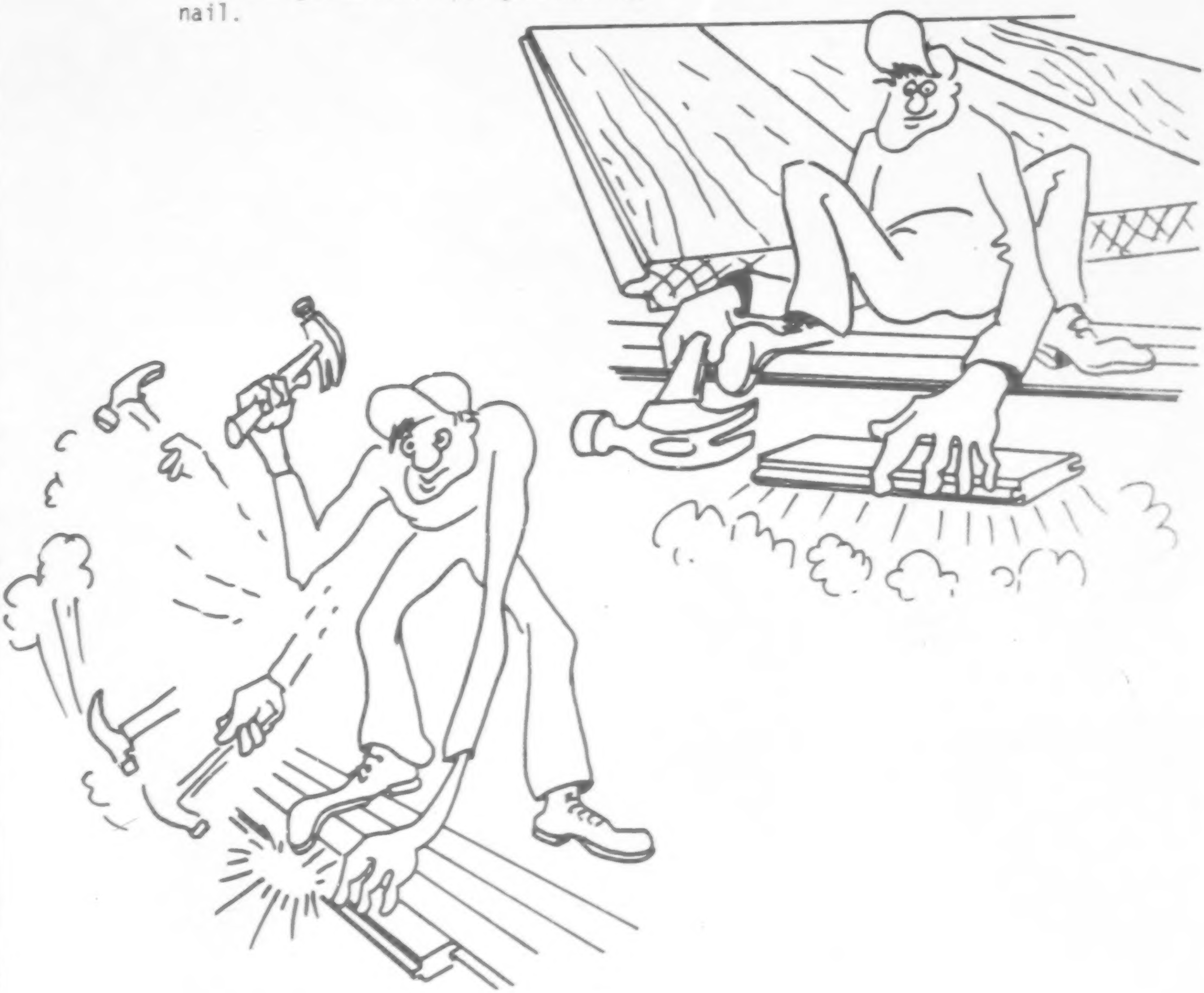
COMPETENCY: Toenail Tongue and Groove Flooring

COURSE: Carpentry UNIT VIII: Exterior Finish

OBJECTIVE: The student will be able to drive tongue and groove flooring in place without damage to edges and toenail in place with hammer and nail set

Page 1 of 2 pages

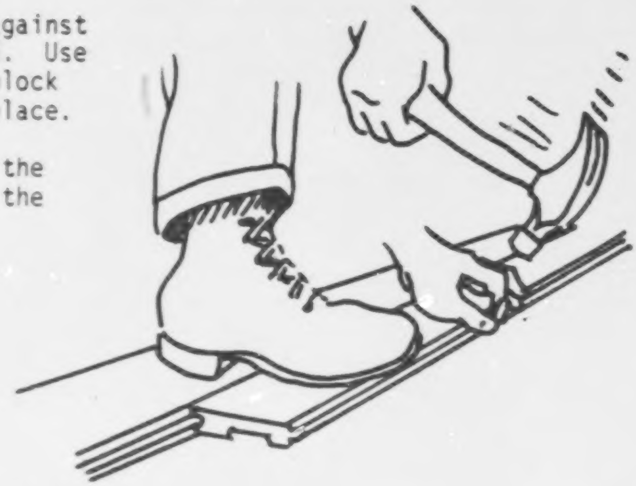
COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Stand with your feet spread apart. Part of your weight should fall on the board you want to nail. When you can, place your right foot just to the right of the spot you want to nail.	



COMPETENCE - PROCEDURE/STEPS | TEACHING/LEARNING ACTIVITIES

2. Tap the board lightly into place against the boards that are already nailed. Use a scrap of flooring as a driving block if the strips are hard to get in place.

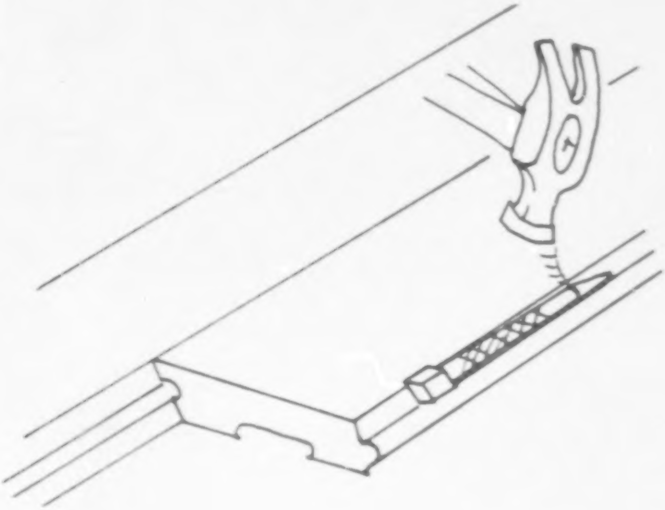
3. Start the nail at the point where the tongue joins the shoulder. Drive the nail at about a 45° angle.



4. Drive the nail as far as you can without hitting the finished edge.

5. Use a nailset to drive it the rest of the way.

NOTE: Flat headed nails should be set as shown.



METHOD OF EVALUATION:

1. Proper technique
2. Nail properly set

574

OPERATION SHEET
SC-8-9

COMPETENCY: Cut Window Glass

COURSE: Carpentry

UNIT VIII: Exterior Finish

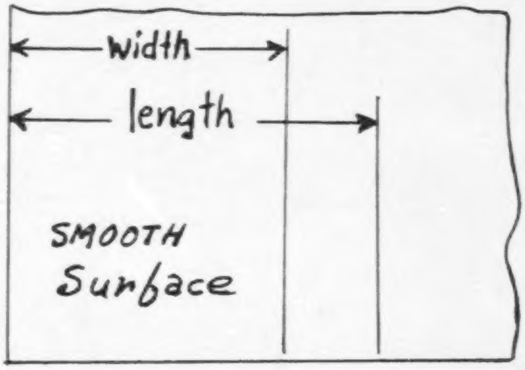
OBJECTIVE: The student will be able to safely and accurately cut glass

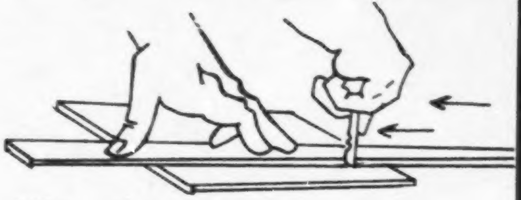
Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS
The student will be able to:

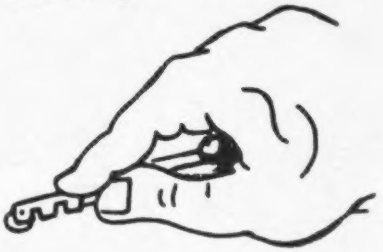
TEACHING/LEARNING ACTIVITIES

1. On a smooth surface, such as a piece of plywood, mark the size of the glass to be cut, both length and width as shown in sketch A.
2. Place the glass on the corner of the plywood over the layout lines.
3. Place a straightedge along the layout line marking the length of the glass. The straightedge should be about 1/16" away from the layout line so the cutter wheel of the glass cutter will be directly over the layout line.
4. Grasp the glass cutter between the first two fingers and thumb, as shown in sketch, and with firm but not too much pressure, move the cutter across the glass directly over the layout line. The straightedge is used as a guide.
5. After passing the cutter across the glass just once lift the glass up a little and place the ball end of the glass cutter just under the edge of the glass directly under the cut.
6. Press down gently on the waste piece allowing the glass to break along the cut from one side to the other.
7. If the break is not clean and pieces of glass need to be removed, select a notch in the glass cutter and place it over the edge of the glass to be removed and snap off pieces until the cut is complete.

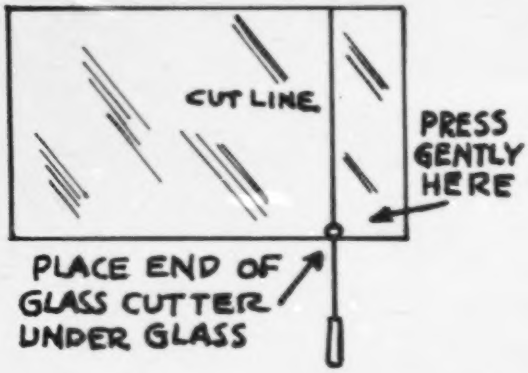


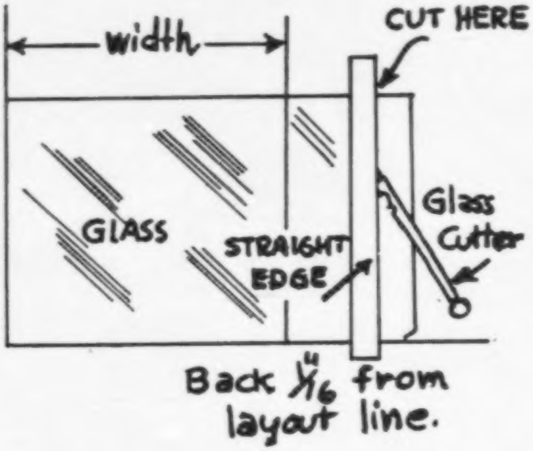


NOTE: The cutter must not pass over the cut more than once or it will dull the cutting wheel. If the cutter is pressed too hard the cut will not be fine and clean, but will chip out or spall along the cut. This may cause the glass to break out sideways instead of along the initial cut. Some mechanics like to dip the cutter into some kerosene or turpentine before making the cut. This is supposed to aid in the cutting.



COMPETENCE - PROCEDURES/STEPS	TEACHING/LEARNING ACTIVITIES
8. If the waste piece is of sufficient size, separate the glass after the initial cut by lifting one side of the glass and grasping the glass between thumb and finger on each side of the cut and gently snapping the glass in two from one side to the other.	NOTE: Be very carefull when working with glass as the edges may be very sharp especially after hand cutting. Broken glass because of sharp points and flying particles can be very treacherous.


CUT LINE
PRESS GENTLY HERE
PLACE END OF GLASS CUTTER UNDER GLASS


width
CUT HERE
GLASS
STRAIGHT EDGE
Glass Cutter
Back 1/16" from layout line.

METHOD OF EVALUATION:

The instructor will inspect finished work.

OPERATION SHEET
SC-8-10

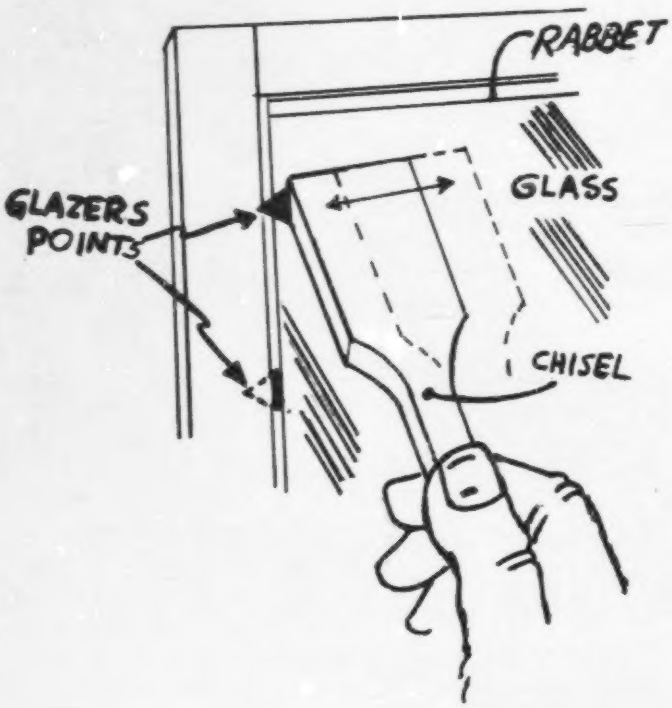
COMPETENCY: Glaze a Window

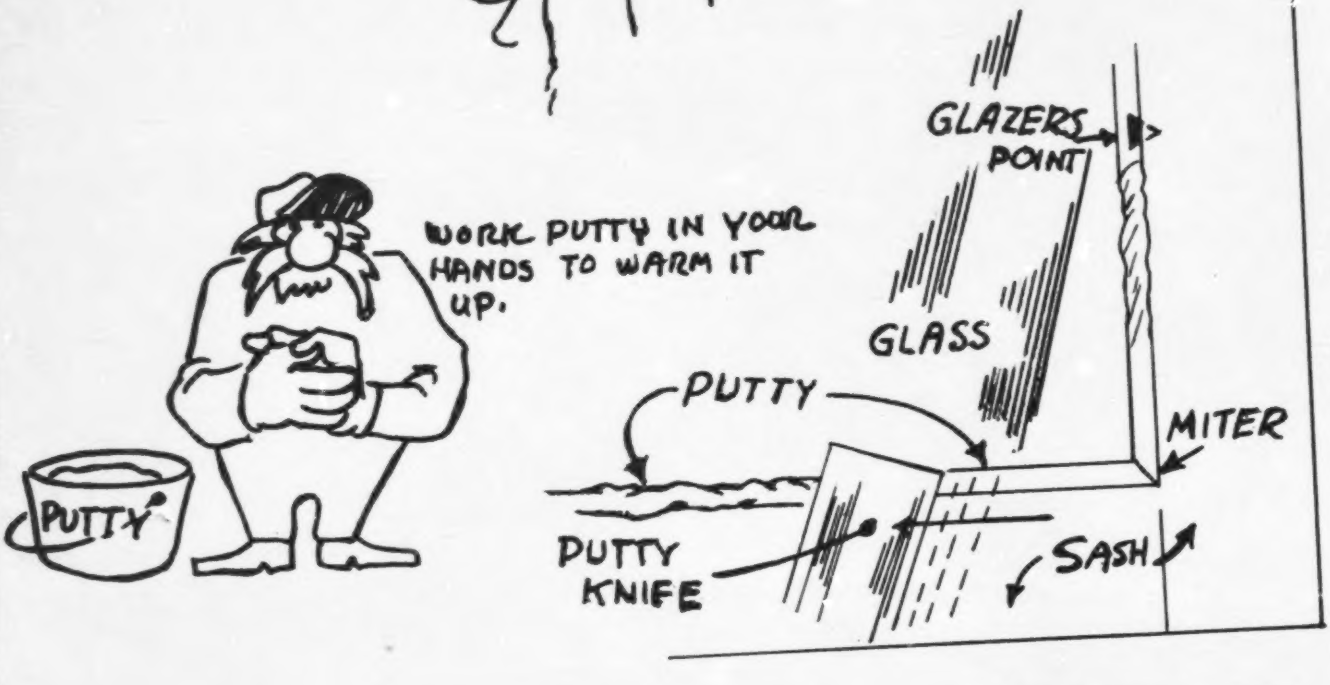
COURSE: Carpentry — **UNIT VIII:** Exterior Finish

OBJECTIVE: The student will be able to glaze properly

Page 1 of 2 pages

COMPETENCE - PROCEDURES/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Make sure that the rabbets around the sash are clean and level so that the glass will fit into the rabbets and lie flat on all sides.	NOTE: For best results the glass should be back puttied by placing a thin layer of putty along the bottom of the rabbet and then bedding the glass into this thin layer.
2. Place the glass into the rabbets pressing gently into the bedding putty. See note.	NOTE: Make sure that pressure is applied evenly over the glass as a slight twist in the glass may cause the glass to brake.
3. Fasten the glass in place with a glazing tacker or by using a wood chisel to set glazing points as shown in sketch.	
4. Take a portion of glazing compound (putty) and work it in the hands until it becomes warm and pliable.	
5. Work a bead of putty into the rabbet along the edge of the glass with the fingers and putty knife. See sketch.	
6. Straighten and level the putty knife.	NOTE: The side of the putty knife will slide along the outer edge of the rabbet. Follow the inner edge of the frame with a corner of the putty knife and keep the end of the putty knife in full contact with the glass at all times.
7. Clean out and miter putty at inside corners.	
8. Smooth and level putty by lightly passing the thumb or finger along the surface of the putty.	


RABBET
GLAZERS POINTS
GLASS
CHISEL


WORK PUTTY IN YOUR HANDS TO WARM IT UP.
PUTTY
GLAZERS POINT
GLASS
PUTTY
MITER
PUTTY KNIFE
SASH

METHOD OF EVALUATION:

The instructor will observe the finished work.

OPERATION SHEET
SC-8-11

COMPETENCY: Use A Caulking Gun

COURSE: Carpentry

UNIT VIII: Exterior Finish

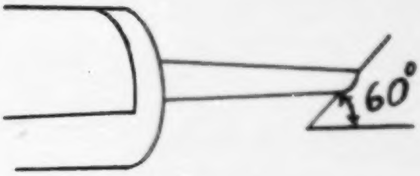
OBJECTIVE: The student will be able to apply caulking around doors or windows with a caulking gun

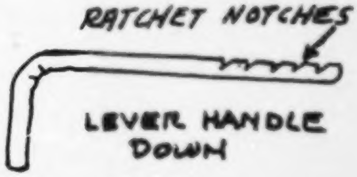
Page 1 of 1 page

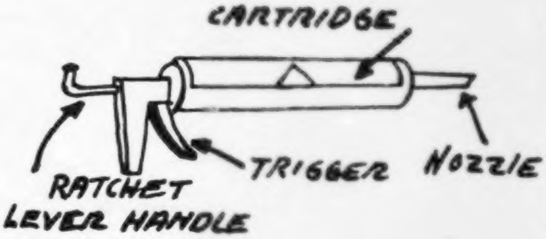
COMPETENCE - PROCEDURES/STEPS
The student will be able to:

1. Turn lever handle down and pull ratchet plunger back to open caulking gun.
2. Place a cartridge of caulking compound into the gun and push the plunger in against the back of the cartridge.
3. Turn the lever handle back up and work the trigger several times to take up the slack.
4. Cut or snip off the end of the plastic nozzle at a slight angle (about 60°).
5. Push a nail or piece of stiff wire into the end of the nozzle to puncture the seal. The gun is ready to operate.
6. Hold the end of the nozzle into the corner where caulking is to be applied and squeeze the trigger. Continue to squeeze the trigger until the plunger begins to push out a bead of caulking.
7. Allow the bead to form in the corner as the nozzle is moved along. The movement of the nozzel and the trigger action must be co-ordinated to produce a neat uniform bead.
8. As soon as the end of a section has been reached stop the trigger action and turn the lever handle to release the pressure and stop the flow of the caulking.

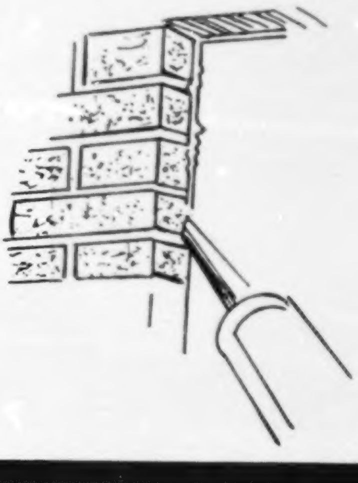
TEACHING/LEARNING ACTIVITIES







NOTE: It may be a good idea to practice making a bead in a corner of two pieces of wood nailed together, so the action of the gun can be practiced first.



METHOD OF EVALUATION:

The instructor will inspect the finished work.

OPERATION SHEET
SC-9-1

COMPETENCY: Lay Out With Scribers

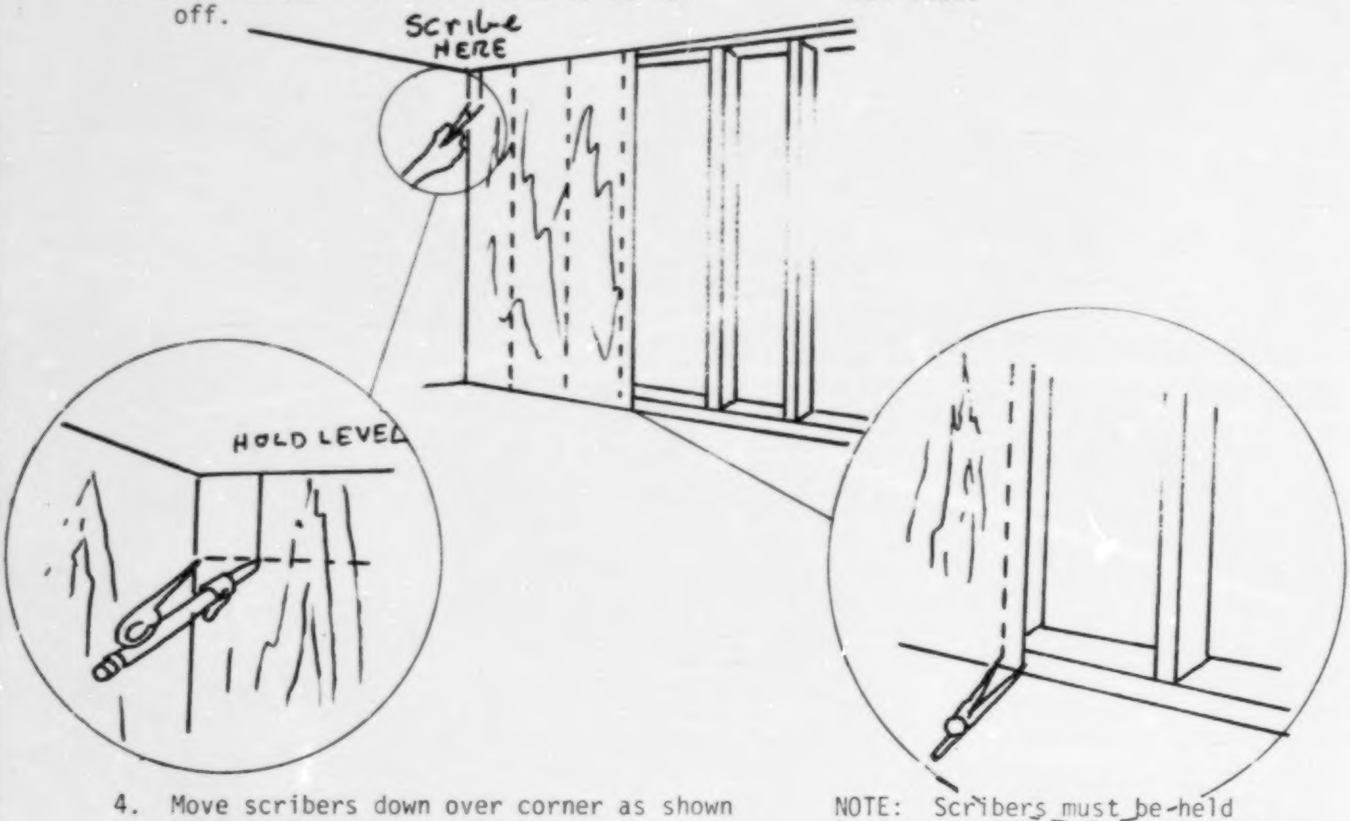
COURSE: Carpentry

UNIT IX: Interior Finish

OBJECTIVE: The student will be able to accuately scribe (layout) material to fit against another surface

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS The student will be able to:	TEACHING/LEARNING ACTIVITIES
1. Lay out and cut sheet to length.	Example: Fit paneling into corner.
2. Set panel into place, plumb and tack fast.	NOTE: Set scribers to amount panel extends beyond center of last stud.
3. Set scribers to the amount to be cut off.	



4. Move scribers down over corner as shown in Fig. 1. Mark panel with pencil leg. Metal leg should be in contact with other wall throughout operation.	NOTE: Scribers must be held level. Do not push or squeeze scribers so as to change setting.

METHOD OF EVALUATION:

Work will be checked for uniform tight fit.

OPERATION SHEET
SC-9-2

COMPETENCY: Mark for a Hinge Gain with a Butt Gage

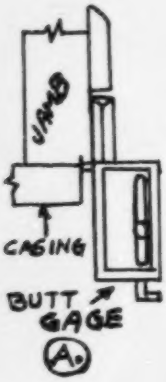
COURSE: Carpentry   **UNIT IX:** Interior Finish

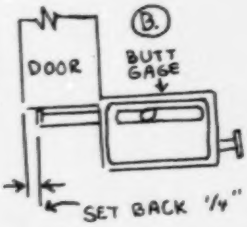
OBJECTIVE: The student will be able to use a butt gage to mark for a hinge gain

Page 1 of 1 page

COMPETENCE - PROCEDURE/STEPS
The student will be able to:

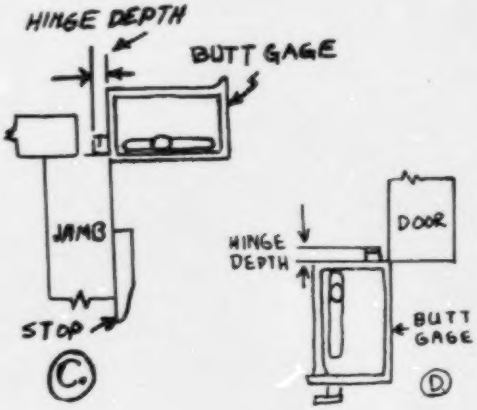
1. Mark position of hinges on door.
2. Set the butt gage to the width of gain as shown in drawing B.
3. Gage the width of the gain or the door as at drawing B.
4. Gage the depth of the gain for the hinge as shown on drawing D.
5. Set the door in the jamb opening and wedge to proper position. Transfer the marks of the hinges on the door to the jamb.
6. Gage the width of the gain on the jamb as shown on drawing A.
7. Gage the depth of the gain on the jamb as shown on drawing C.


JAMB
CASING
BUTT GAGE
A.


B.
DOOR
BUTT GAGE
SET BACK 1/4"

TEACHING/LEARNING ACTIVITIES

NOTE: Hinges are usually set 5" down from the top of the door and 10" up from the bottom.


HINGE DEPTH
BUTT GAGE
JAMB
STOP
C.
DOOR
HINGE DEPTH
BUTT GAGE
D

NOTE: Make all markings with a knife. Be careful not to mark beyond cut out lines.

METHOD OF EVALUATION:

The instructor will observe the neatness and accuracy of layout.

INFORMATION SHEET
IL-2-12

TITLE: Selection and Use of Nails

Page 1 of 2 pages

COURSE: Carpentry

UNIT II: Hand and Machine Tool Processes

The nail, to our knowledge, is one of the first types of wood fasteners. Its origin dates back as far as we can go in History. Nails were not common in early days, because they were made by hand, usually by the housewife. As the building of houses and furniture increased, the demands for nails increased, providing the need for nail making machines, and that made it possible to turn nails out on a production basis.

CUT NAILS: The cut nail was the first type of nail manufactured. Its rectangular shape was available in a variety of lengths and styles. The prime use of the cut nail today is to secure siding and flooring materials. This is due to the great holding power which the cut nail possesses. The broader side of the cut nail should be even with the grain, to prevent splitting.

COMMON WIRE NAILS: The cut has been replaced by the common wire nail in most places because the wire nail can be manufactured easier, cheaper, and in higher weight quality. The wire nail is available in a variety of styles, sizes and different material. Each style and material has been designed to perform a specific duty that would not be performed by the ordinary wire or cut nail.

FINISH AND MATERIAL: The common wire nail is available in the following finishes and material;

1. Plain steel (general carpentry)
2. Asphalt cement coated nails (Insulating siding and sheathing)
3. Galvanized coated steel (general carpentry in damp areas)
4. Zinc coated steel (asbestos and asphalt materials)
5. Blued steel (used for plastering surfaces)
6. Copper nails (copper material, mainly flashing)
7. Brass nails (used mainly with boats)
8. Aluminum nails (used with aluminum materials)
9. Rosin coated steel (has good holding power)

GRADING OF NAILS: Nails are properly graded according to their length and distinct gauge. For example, a four penny nail is one and one half inches long and is made of 12-1/2 gauge steel as for a 20 penny nail from 4 inches long and made of 6 gauge wire. The diameter or gauge decreases with the length. The common wire nail can be obtained in these D sizes: 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 30, 40, 50,and 60. Nails under 4D are classed as wire brads, and as wire nails, brads have heads. Nails over 12D are usually called spikes. The 10D originated in the days when the symbol for 10 was D.

NAIL SIZES:

SIZE	LENGTH
4D	1-1/2 inches
5D	1-3/4 inches
6D	2 inches
7D	2-1/4 inches
8D	2-1/2 inches
9D	2-3/4 inches
10D	3 inches
12D	3-1/4 inches
16D	3-1/2 inches
20D	3-3/4 inches
30D	4-1/2 inches
40D	5 inches
50D	5-1/2 inches
60D	6 inches

ASSIGNMENT SHEET
AS-2-12

TITLE: Selection and Use of Nails

COURSE: Carpentry

TEXT/REFERENCE: MODERN CARPENTRY, Wagner, p. 67;
FUNDAMENTALS OF CARPENTRY, Volume I, pp. 184-193.

ASSIGNMENT: Read the above references and answer the following questions.

1. The letter used to indicate the term "penny" is

   ____________________.

2. The length of a 2 penny nail is ________________.

3. A 20-penny nail is longer than a 16-penny nail by

   ________________.

4. The ______________ nail has a heavy cross section and is designed for rough framing.

5. The _____________ nail is the same weight as the box nail but has a small conical head.

6. Cement coating on a nail _______________ its resistance to withdrawal.

7. ________________ nails are blue and sterilized.

8. Duplex-headed nails are for work that must be

   ________________.

9. Casing nails are used for _______________ work in heavy wood.

10. A 60 penny nail is _______________ inches long.